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EUROPE AND THE MEDITERRANEAN



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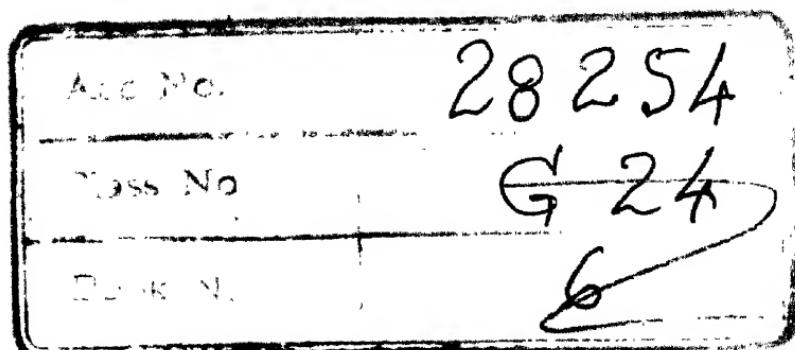
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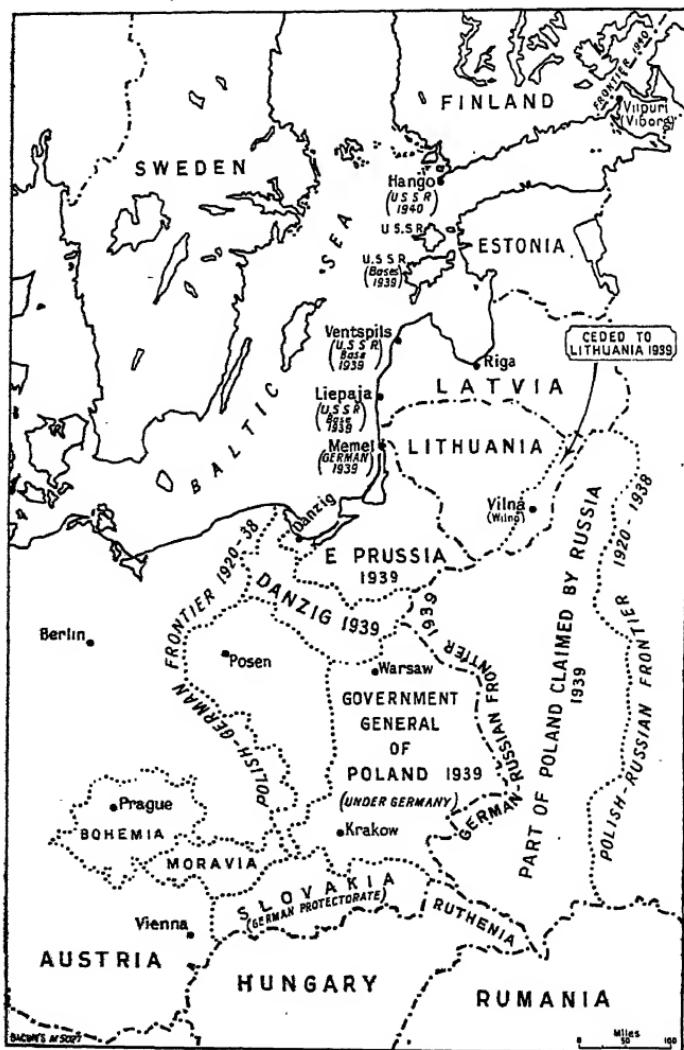
PREFACE TO THE NEW IMPRESSION OF THE SEVENTH EDITION

THIS reprint goes to press at a time when Europe is torn by war. It is impossible, even if it were desirable, to rewrite at present the sections on those countries whose status or whose boundaries have been changed up to the present by the course of the war, and so the book as a whole has been reprinted unchanged. Throughout, the expression "pre-war" refers to the Great War of 1914-18.

It may be useful, however, to recall the general sequence of recent events. In the spring of 1938 Germany, following a declared policy of uniting all German-speaking peoples, seized and incorporated in the German Reich the German-speaking republic of Austria. In September, 1938, France and Britain reluctantly agreed to the German occupation of those borderlands of Czechoslovakia inhabited largely by German-speaking people, and at the same time sections of southern Slovakia with a large Hungarian population were added to Hungary. In March, 1939, Germany went beyond the territories inhabited by German-speaking peoples by occupying the rest of Czechoslovakia, declaring Bohemia, Moravia and Slovakia "protectorates." The eastern extension of Slovakia (Ruthenia) passed to Hungary. Alarmed by this German aggression, Great Britain and France guaranteed the integrity of Poland, and so, when Germany invaded Poland, war was declared between the Allies (Britain and France) and Germany on September 3, 1939. Germany had already annexed Memel and its neighbourhood (Memelland) from Lithuania and then seized Danzig. As German forces swept over Poland from the west, Russia invaded the country from the east. In a few weeks Warsaw and many other Polish cities were reduced to ruins, and Germany and Russia divided the country between them, a small tract around Vilna being handed over to Lithuania.

Russia then proceeded to consolidate her position in eastern Europe while Germany attacked one country after another in western Europe. Before 1914 the Russian Empire had extended to the Baltic Sea, but in 1919 only a very small section of coastland around Leningrad at the head of the narrow Gulf of Finland remained in Russian hands. In 1939 the U.S.S.R. demanded and obtained naval and air bases in Estonia, Latvia and Lithuania, but Finland refused Russian demands. Russia thereupon attacked

Finland, and a short but very fierce war was waged in the winter of 1939-40. To save their country from further slaughter Finland eventually agreed to give up Viipuri (Viborg) and a tract of country in the south-east, and to lease to Russia the ice-free port of Hango. Russia increased her military hold on the three Baltic states and



Map of Poland showing the partition of 1939.

in the south-east occupied the Rumanian provinces of Bessarabia and Bukovina (June 27-28, 1940) after delivering an ultimatum to the Rumanian government. On July 21, 1940, Estonia, Latvia and Lithuania decided to join the U.S.S.R. as Soviet republics.

In the meantime Germany had invaded Denmark and Southern

Norway on the morning of April 9, but their control of Northern Norway was prevented by the Allies until the break-up of the ice in the Baltic rendered the expensive holding of Narvik unimportant. In the early morning of May 10 the Germans invaded Holland, Belgium and Luxemburg. They had prepared their way by the use of agents and spies with the result that almost the whole of Holland was occupied in five days, although the Allies, begged for immediate help, attempted to rush to the aid of Belgium and Holland. The Germans, making great use of aircraft and tanks, made a thrust to cut off the British and Belgians in the north from the French in the south and succeeded in reaching Boulogne on May 23. King Leopold of the Belgians, as Commander-in-Chief of the Belgian army, ordered the surrender of his troops to the Germans on May 28 without any warning to the Allies. Thus left unprotected on the flank, the Allied armies withdrew through the port of Dunkirk and evacuated Northern France and Belgium.

Concentrating enormous forces the Germans pressed on and occupied Paris, which was abandoned to prevent its destruction and was entered by the Germans on June 14. Italy, seizing the opportunity of France's dilemma, declared war on June 10. On June 16 the French Premier was forced to resign and Marshal Pétain became Premier. Without consulting the French people, he asked Germany for an armistice. Fighting ceased on June 25, the Germans occupying the whole of Northern France and the west coast. Britain and the Empire were left to continue the struggle alone.

Since the last edition of this book was printed Italy, on Good Friday 1939, occupied Albania.

L. D. S.

22nd July, 1940.

NOTE ON BOOKS FOR FURTHER READING

A valuable and up-to-date source of reference will be found in "A Handbook for Geography Teachers." Methuen, 1932. 4s.

GENERAL.

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EUROPE

SECTION I GENERAL CONSIDERATIONS

Position and Size.—With an area of only 3,760,000 square miles, Europe is the smallest of the continents excepting Australia. It is characterized by the comparatively great length of the coastline, broken up everywhere by peninsulas, gulf s, bays, and fringed by islands, with the result that only the heart of Russia is more than

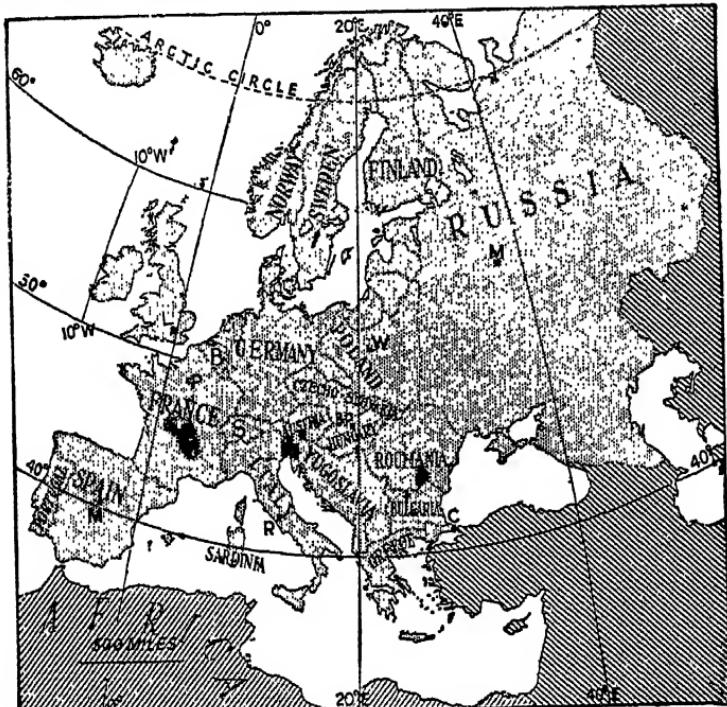


FIG. 1.—The position and size of Europe.

500 miles from the sea. Europe lies almost entirely in the North Temperate Zone; only a small fragment in the north is within the Arctic Circle ($66\frac{1}{2}^{\circ}$ N.). It is useful to note the position of latitude 40° N.: cutting Spain and Portugal nearly in half, cutting off the "toe" of Italy, passing through Greece, and running south of the Black Sea, but across the south of the Caspian. Note also that

the British Isles lie roughly between latitudes 50° and 60°. The central meridian in Europe is 20° E. (the same one as in Africa); the all-important meridian of 0° passes, of course, through London; through the heart of Russia runs 40° E.

Structure and Physiography.—Europe may be divided broadly into four groups of units on the basis of structure and relief :

- (a) The ancient earth-blocks of the north.
- (b) The Russian Platform.
- (c) The Great European Plain.
- (d) The young fold mountains of the south, formed of many mountain loops, enclosing small plains and plateaus.

The Ancient Earth-blocks of the North.—There are now in the

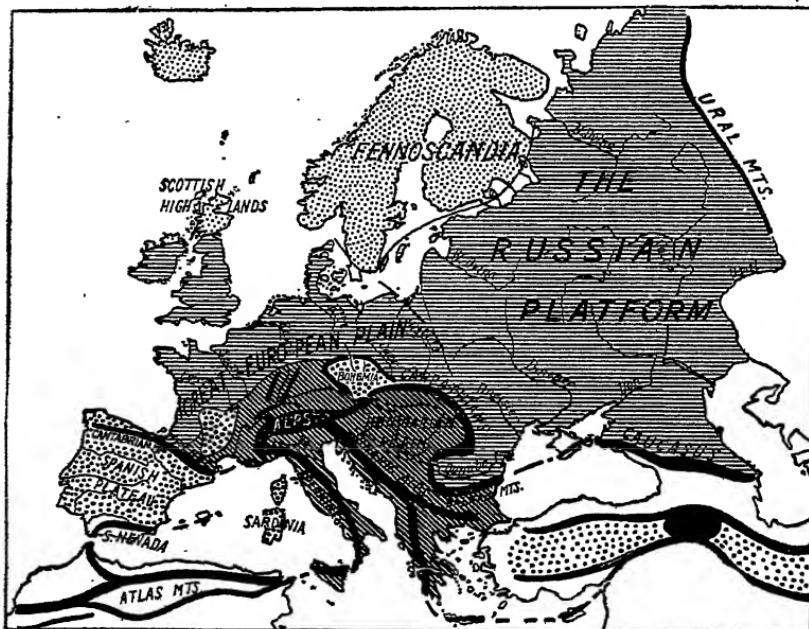


FIG. 2.—The main physical and structural features of Europe.

north of Europe four masses, each consisting of ancient metamorphic rocks. Probably the four masses were once joined up, forming a single continental mass. This was formed in the early days of the earth's history by the earth movements known as the Caledonian which occurred at the end of the Silurian period. These earth movements resulted in the formation of a great series of mountain chains which had a general trend from north-east to south-west. For long ages the land mass so formed remained above sea-level, but was gradually worn down by the agents of subaerial denudation, till much of the tract became of low, or at least mature, relief. During the Tertiary era, when the great Alpine earth movements

caused the rise of the Alps and Apennines, the Pyrenees and Carpathians, the old hard blocks in the north seem to have been strained or cracked. In some places volumes of basaltic lava broke through and flooded the surface; in other cases two sets of cracks at right angles to one another developed, and parts of the blocks were upraised, others sank. Then came the Great Ice Age. The higher portions of the blocks became centres of ice caps; as the volume of ice increased and moved outwards from the centre of accumulation it profoundly affected the surface of the land over which it moved. It smoothed the jagged outlines, scooped out gigantic hollows (especially along the lines of weakness afforded by the cracks already mentioned) swept large areas entirely bare of soil. When the ice finally retreated, it left behind areas of ancient



FIG. 3.—Map of Europe showing the maximum extent of the ice sheets of the great Ice Age.

rock with a typically glaciated topography—smoothed outlines, lake-filled hollows, huge tracts of almost soil-less country, and accumulations of boulders or sand or clay elsewhere. Such is essentially the character of the three chief areas.

- (a) Fennoscandia, comprising Norway, the northern two-thirds of Sweden, and Finland.
- (b) The Highlands of Scotland.
- (c) The highlands of north-western Ireland.

The fourth area, Iceland, is marked by the great outpourings of lava of Tertiary and later date, and similar patches of lava occur along the west coast of Scotland and in north-eastern Ireland. Perhaps the most characteristic area of glaciated plateau is that “land of ten thousand lakes,” the heart of Finland; whilst the

most striking results of glacial and subaërial excavation along lines of weakness are afforded by the fiords of Norway and of western Scotland.

The ancient rocks are, of course, devoid of coal and oil, but metalliferous deposits are frequently important. The great masses of fine quality iron ore of northern Sweden may be specially mentioned.

The Russian Platform.—An area of ancient metamorphic rocks, somewhat similar to the Fennoscandian block, underlies practically the whole of Russia in Europe, but there the ancient rocks for a time sank below sea-level, and later again rose. They were thus hidden long before the Ice Age by wide stretches of sediment. The hard, old block beneath, however, prevented these sediments from being crumpled or folded by the Tertiary movements; the Ice Age merely succeeded in giving most of Russia a further coat of sedimentary deposits—this time of glacial origin and representing in the main loose material which had been swept off the surface of the Fennoscandian block. Hence the Russian platform is a great block of ancient rocks, almost completely covered with little disturbed sediments which are in turn masked by superficial deposits of glacial origin.

The Great European Plain.—Lying to the south of the ancient blocks of the north and north of the young fold mountains of the Alpine system, is the Great European Plain. Much of it is less than 500 feet above sea-level, and nearly the whole of it is under 2,000 feet. It must not, however, be looked upon as a flat plain, such as the Amazon lowlands, or even as a gently undulating area such as the prairie regions of America, being broken up by a multitude of small hills and even by mountain ranges. This varied character of the surface is a reflection of the complex geological history and structure. From the structural point of view we may distinguish broadly three groups of units:

(a) The "islands" of ancient rocks consist mainly of hardened sediments. From their character they tend to be resistant to weathering and stand up as hill masses, whilst the rocks usually yield but a poor soil. As examples may be quoted the Southern Uplands, the Lake District, the Pennines, Wales and the South-Western Peninsula in Britain; Brittany in France; the Ardennes in Belgium; the Rhine Gorge Massifs and the Harz mountains in Germany. The resistant character of the rocks is often accentuated by the presence of masses of granite (as in Cornwall and south-eastern Ireland), or old volcanic rocks (as in North Wales and the Lake District). The poverty of the soil usually prevents such areas from being important agriculturally, and they tend to be covered with moorland or rough pasture, or to be forested. Many of the important metalliferous deposits of Europe are associated with

these islands of old rock, e.g. the tin of Cornwall and the copper of the Harz.

(b) The intervening stretches of younger sedimentary rocks tend to form country of lower relief, of richer soils, and of greater importance economically. The rocks are usually but slightly folded, but the folding has been sufficient to give rise to lines of hills, where the more resistant members of the succession (such as the limestones,

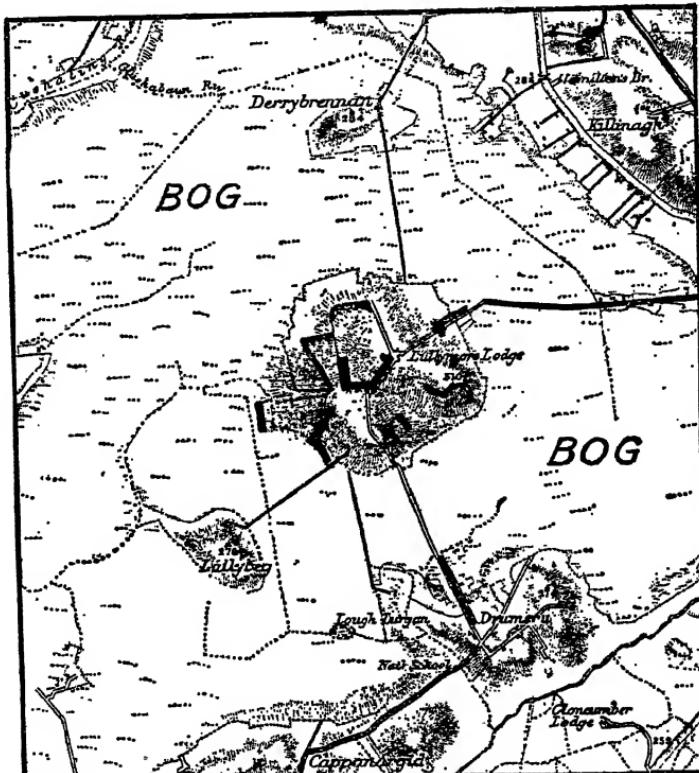


FIG. 4.—Reproduced from the 1-inch to the mile Ordnance Survey Map by permission.

Portion of country in the heart of central Ireland showing glacial topography of the type found in the Great European Plain. There are "islands" of well drained sands in water logged bogland.

including chalk) are found, and to broad valleys where the softer members, such as clays, are found. South-eastern England (the Scarplands) is typical of the type of topography developed.

The coalfields of Europe tend to occur on the flanks of the older masses, but are frequently worked, in whole or part, through an overlying cover of younger rocks (e.g. the coalfields on the flanks of the Pennines). Many of the important iron ore deposits, such

as those of the Midlands of England and those of Lorraine, are sedimentary rocks belonging to this group.

(c) Enormous areas of both the ancient islands and young sediments are hidden by a mantle of glacial deposits. We have already referred to the formation of ice caps over northern Europe and the southward spread of the ice. The rock débris swept from these northern areas was carried or pushed by the ice southwards. Then came the waning of the Ice Age, the melting and the retreat of the ice. The débris was left behind as a thick coat over the surface of the land. The retreat of the ice was not a steady movement, but took place rather by a series of jerks. The halts are marked by characteristic ridges or terminal moraines extending, often for hundreds of miles, across the country. At the same time the innumerable streams of water which arose from the melting ice redistributed the finer material, or sorted the mixed débris into gravels, sands, or silts, collectively known as fluvio-glacial deposits. The strong, cold winds which developed round the retreating ice-front still further affected the glacial deposits by removing the finer particles as dust and re-depositing them as a coating of loess stretching well to the south of the glaciated area. It follows from this that the mantle of superficial deposits which covers so much of the European Plain varies enormously in character. One may distinguish :

(i) the morainic ridges, often largely built up of large boulders, though ridges of finer material are also common ;

(ii) stretches of boulder clay—stiff clay consisting of finely-powdered rock, in which are embedded huge numbers of boulders. Boulder clay country is often hummocky : the hummocks may be well drained and comparatively fertile, the hollows water-logged and marshy. Much of the central plain of Ireland is of this character, the hummocks or drumlins being separated by huge tracts of almost useless bog ;

(iii) stretches of gravel and coarse sand affording poor soil owing to its very light and porous nature. Such tracts are often marked by moorland or sterile heathland ;

(iv) stretches of loess (the *limon* of the French)—the most fertile of all, and frequently affording very valuable tracts of agricultural land.

The glacial deposits as a whole were called "diluvial" by the older geologists. The word "diluvial" indicates a long-deceased belief that these deposits were formed during Noah's flood ; the word unfortunately still persists in some geography books. It will be seen that some glacial deposits can be very fertile, but others are very unfavourable to agricultural development. The struggle of Danish, North German, and Polish agriculturalists against un-

favourable soil conditions is a factor of great geographical importance.

The Great European Plain fades eastwards into Russia, where glacial deposits of the type already described cover most of the surface. It will be noted that the plain, as described here, embraces, in its broad sense, the whole of the British Isles south-east of the Highlands of Scotland, and north-western Ireland, western and northern France, Belgium, Holland, northern Germany, Denmark, southern Sweden, and the greater part of Poland. It follows that, other factors such as climatic and economic being comparable, these areas have many characteristics in common, and the geography of the European Plain should be studied as a whole.

The Young Fold Mountains.—The complicated series of young fold mountains, mostly of Tertiary or "Alpine" age, which occupy the southern half of Europe may be understood most simply by taking the great mountain knot of the Alps as a starting-point. The Alps themselves form a short curve from west-south-west to east-north-east. The western end of the chain swings southwards, then eastwards, and then runs south-eastwards through Italy as the Apennines, curving westwards again through the toe of Italy into Sicily. From Sicily to North Africa there is only a small gap, and the same line forms the important Atlas Mountains of Africa. The Atlas Mountains consist of two or more parallel ranges. A branch curves northwards and runs into Spain as the Sierra Nevada.

From the western end of the Alps another branch runs south-westwards, but it is soon cut off by the sea, to be continued later as the Pyrenees and the Cantabrian Mountains.

From the eastern end of the Alps there are really three main branches. One runs south-eastwards as the Dinaric Mountains into the Balkan Peninsula, where it divides. A second runs eastwards and is cut across by the Danube, only to be continued in a long curve like an "S" written backwards, forming the Carpathians, Transylvanian Alps, and the Balkan Mountains. The third branch forms a small loop to the north, surrounding the plateau of Bohemia. Close to the Alps on the north-west lies a small range, the Jura, parallel to the main ranges of the Alps. Enclosed or partly enclosed by these fold mountains are plateaus and plains. Many of the plateaus consist of old rocks which have formed resistant massifs. Nearly the whole of Spain is occupied by a high plateau called the Meseta. In the south of France, to the west of the Alps, lies the Central Plateau. The Vosges and Black Forest, separated by the Rhine rift, lie north of the Jura. North of the Alps a series of small plateaus builds up Southern Germany; the distinctive Bohemian plateau we have already noted. It may be mentioned here that the Mediterranean Sea has been largely explained by the "founder-

ing " of blocks of the earth's surface ; the islands of Corsica and Sardinia may be looked upon as remnants of these masses.

The most important plains enclosed by the mountain chains are the Valley of the Po or the Plain of Lombardy in Northern Italy, and the Great Hungarian Plain.

Until comparatively late in geological times the greater part of what is now southern Europe and the Mediterranean was occupied by an extensive sea known as the Tethys. Great thicknesses of limestone and other sediments were laid down in this sea, and when the Tertiary, or Alpine, earth movements were initiated and the Tethys proved an area of weakness, these sediments formed the bulk of the material of which the mountains were built.

As a whole the young fold mountains are not rich in minerals. Coalfields are few or absent ; oilfields occur on the flanks in Rumania and Poland ; but the chief power resources—water-power or white coal—are due to an entirely different factor. The blocks of old rocks enclosed within the folds are, however, often richly mineralized, as in Spain. Agriculturally the soil afforded by the old plateaus and the young mountains are poor ; further, the Mediterranean climate does not encourage the rapid formation of soil. Attention, therefore, is riveted on such broad alluvial plains as that of the Po, or stretches of young rock such as the Hungarian Plain. The wetter parts of Mediterranean lands can, however, be very fertile.

The Rivers of Europe.—Europe has many rivers ; most of them are small, but they are important because they are of great use to the busy industrial countries through which they flow. We may separate the larger rivers into three groups :

- (a) Rivers flowing northwards from the fold ranges to the sea on the north side of the mountains.
- (b) Rivers on the south side of the mountains.
- (c) The rivers of Russia.

Rivers Flowing Northwards.—In France are the Loire and the Seine ; in Germany, the Rhine, Elbe, Oder ; and in Poland, the Vistula.

Rivers to the South of the Mountains.—This group includes the rivers of Spain and Portugal—the Douro, Tagus, Guadiana, and Guadalquivir emptying into the Atlantic Ocean, and the Ebro into the Mediterranean. In France is the Rhone, and in Italy the Po. One of the most important rivers of Europe is the Danube, which rises to the north of the Alps, but flows east-south-eastwards, cutting through three important ranges before it reaches the Black Sea.

The Rivers of Russia.—The longest river in Europe is the Volga, which does not enter into the ocean, but flows into the largest salt lake in the world—the Caspian Sea. More than half European Russia lies in the basin of the Volga. In South Russia are the

Dniester, Dnieper, and the Don, flowing into the Black Sea ; further north, the Western Dwina flows into the Baltic and the Northern Dwina into the Arctic Ocean.

The small but important rivers of the British Isles will be separately considered.

The Mineral Resources of Europe.—Having studied the general structure of Europe, it is possible to see the relationship of the various mineral deposits of the continent with regard to its structural geology. Very broadly speaking, a correlation is possible as follows :

(a) Coal.—The important coalfields of Europe are mainly of Carboniferous age, and are associated with those islands of older rock which lie among the later strata covering the North European

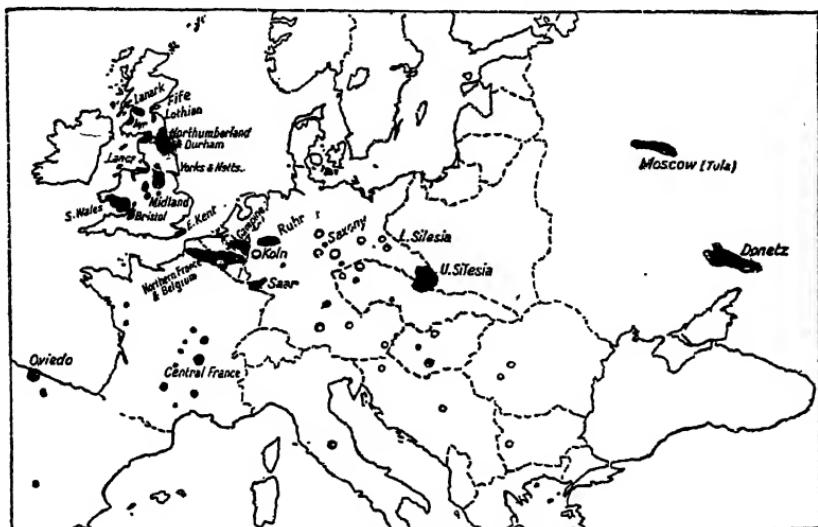


FIG. 5.—The coalfields of Europe.

Solid black areas or dots show fields of bituminous coal; circles indicate the principal lignite or brown coalfields.

Plain. Sometimes the coalfields are found on the borders of ancient rocks, as around the central masses of France.

(b) Oil.—The somewhat scanty oil deposits of Europe are associated with a few fields occurring usually on the flanks or amongst the foothills of the young fold mountains.

(c) Water-power.—The water-power resources of Europe may be considered here, and are, of course, associated with the mountainous areas ; but Europe has the great advantage in this connection of a rainfall throughout the year in most parts outside the Mediterranean countries. The comparative mildness of the climate in north-west and central Europe results in the water brought by the rain being available throughout the year.

(d) Metalliferous minerals.—Europe on the whole is not very rich in metalliferous minerals, but those which occur are associated particularly with the blocks of ancient rocks, more especially the smaller blocks of this character which lie in the south in the fold ranges of the Alpine system, or with the islands of ancient rock in the North European Plain. A very important exception is iron ore. The bulk of the iron ore mined in Europe is sedimentary ore, lower in quality, but vast in quantity, which occurs among the sedimentary rocks of the North European Plain. The iron ores of Central England and the deposits of Lorraine in France belong to this category. We will now consider some of these resources in greater detail.

(a) Coal.—The map, Fig. 5, illustrates the concentration of the principal coalfields of Europe in the North European Plain. The great British fields, which lie between the Highlands of Scotland and a ridge which runs across the middle of England underlying the younger Jurassic rocks, will be dealt with later. Besides this belt, it is to be noted that there is a great succession of coalfields starting with the South Wales coalfield, passing through the Forest of Dean, through Kent into the great coalfield of northern France and Belgium, which stretches right through into Germany. North of

EUROPEAN COALFIELDS
(In millions of metric tons)

Country	Reserves	Production		
		1922-24	1927-30	1931-34
Austria : lignite	720	2.9	3.2	3.0
Belgium	11,000	22.5	27.4	25.0
Bulgaria	388	1.1	1.5	1.5
Czechoslovakia : coal	28,400	12.7	14.9	11.4
" lignite	12,000	18.7	20.5	16.1
France : coal	15,951	37.9	52.7	47.7
" lignite	1,632	0.9	1.1	1.0
Germany (including Saar) : coal	350,000	115.1	152.7 ¹	111.1
" lignite	13,381	126.6	159.3	130.0
Hungary : lignite, etc.	1,717	7.3	7.0	6.8
Italy : lignite	99	0.9	0.7	0.4
Yugoslavia : lignite, etc.	4,205	4.0	4.8	4.5
Netherlands : coal	4,402	5.5	11.1	12.7
Poland	80,000	30.9	40.7	30.9
Portugal	20	0.1	0.2	0.2
Rumania	39	2.4	2.9	1.7
U.S.S.R. (including Asiatic Russia)	137,000	13.2	34.1	67.6
Spain : coal	8,001	5.5	6.7	6.3
" lignite	787	0.4	0.4	0.3
Spitzbergen	8,750	0.4	0.3	0.3
Sweden	114	0.4	0.4	0.3
United Kingdom	189,533	268.5	254.1	217.5

¹ Not including Saar, the production of which was about 10 million tons in 1931-34.

this line occurs the Campine coalfield, partly in Belgium and partly in Holland, and then the greatest of all the German coalfields, the Ruhr. South of this line is the Saar coalfield, and then, passing eastwards, the small Carboniferous coalfield of Saxony and the large coalfield of Upper Silesia, lying partly in Czechoslovakia, but mainly in Germany and Poland. Away to the east of Europe are the Tula and Donetz coalfields of Russia. It should be noticed that this main line embraces the larger coalfields of Europe. Outside this group there are only the small coalfields round the ancient rocks of the massif frontier of France, and the small but important coalfields of northern Spain.

In Germany and the countries of central Europe, however, the deposits of brown coal or lignite are often extremely important,

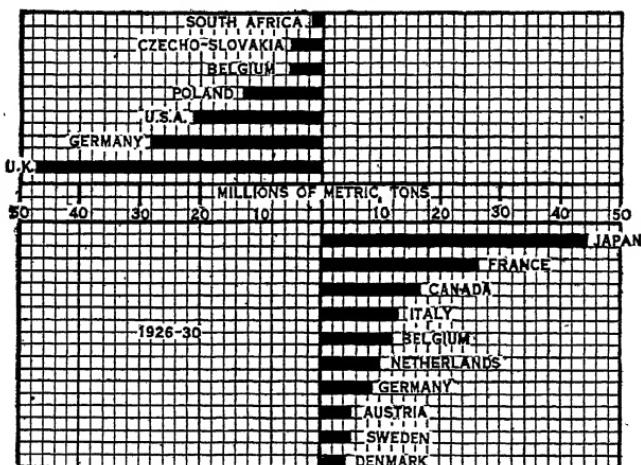


FIG. 6.—World trade in coal, 1926-30.

Above the scale are the exporting countries, below are the importing countries.

and a large proportion of the resources and output of Germany are of this character.

That many European countries are deficient in coal is apparent not only from the map but also from Fig. 6, which illustrates the world trade in coal in recent years. It is necessary to realize the relative importance of the coal-producing countries of the world, hence the insertion here of Fig. 7, which illustrates at once that more than one-third of all the coal in the world is produced by the United States, whilst more than another third is produced in the United Kingdom and Germany, leaving a comparatively small proportion in the other countries.

(b) Oil.—Only two countries in Europe, if one excludes the Russian fields, are big oil producers. They are Rumania and Poland. Rumania ranks fourth as a world producer after the United States, Russia and Venezuela; Poland is fourteenth. The principal

fields are amongst the foothills on the outer flanks of the Carpathians (or those of the Transylvanian Alps) near Ploesti. In a similar position on the outer flanks of the Carpathians proper are the fields of Galicia, now lying in the territory of Poland. Germany has a

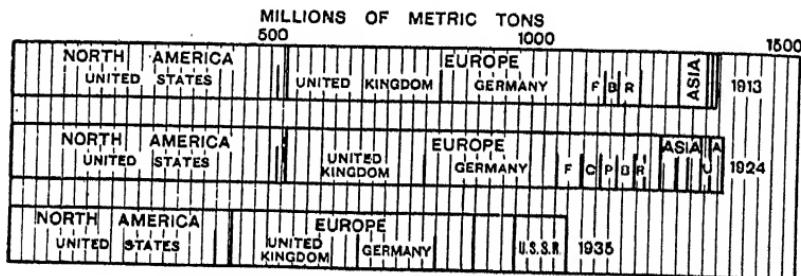


FIG. 7.—Production of coal (including lignite) in the principal countries.
F = France; B = Belgium; R = Russia (pre-war frontiers in the 1913 diagram); C = Czechoslovakia; P = Poland; U = Union of South Africa; A = Australasia.

small production of oil from several wells in Hanover, whilst France carries on the *mining* of oil sands at Pechelbronn. Prospecting for crude oil in Great Britain has proved a failure, but mention must be made of the oil shales of Carboniferous age, long worked in the Midland Valley of Scotland. Russia has both a large output and

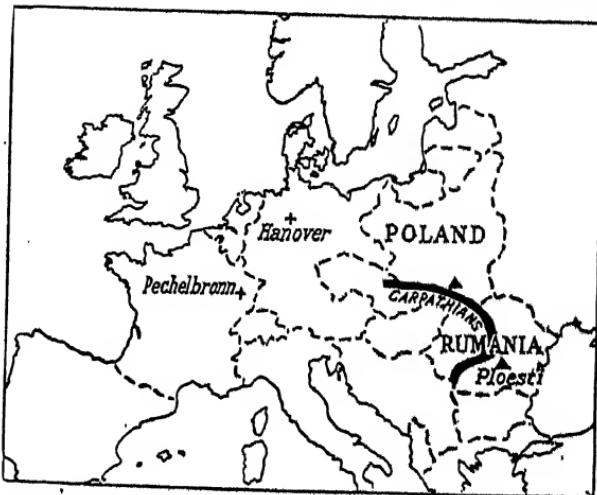


FIG. 8.—Map showing the oilfields of Europe (marked by triangle for the larger fields, crosses for smaller).

extensive reserves. It will be gathered that all the European countries, with the exception of Russia, Rumania, and Poland, figure as large importers of mineral oil.

(c) *Water-power.*—Although not strictly a "mineral," the "white coal" of Europe is the third great source of power, and may conveniently be mentioned here. Naturally the chief reserves of

water-power are in mountainous regions—actually in those regions which are devoid of, or poor in, coal. The following table shows the relative importance of the countries of Europe, but it should be

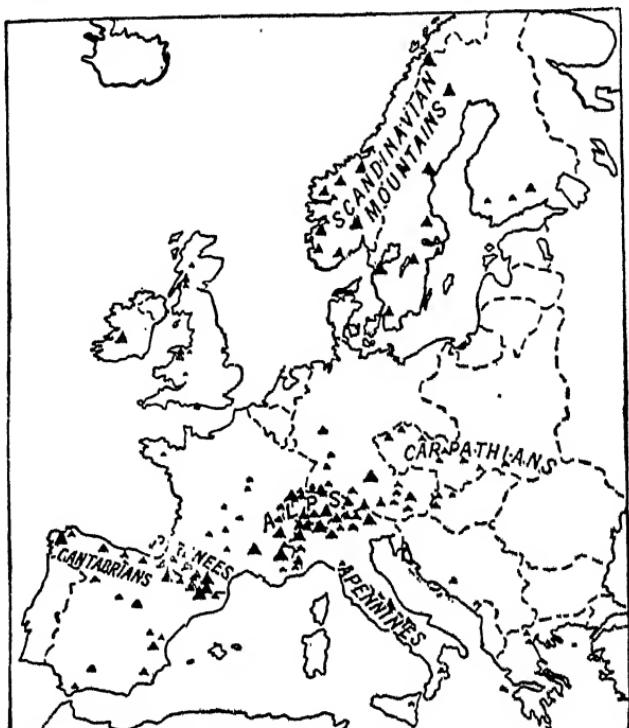


FIG. 9.—Water-power in Europe.

The triangles show the principal hydro-electric installations.

noticed that those countries (Norway and Sweden) which head the list for *undeveloped* power are exceeded by both France and Italy in power actually developed.

WATER-POWER OF EUROPEAN COUNTRIES

Country	Undeveloped (in H.P.)	Turbine H.P. Total	Installed as in 1930. Per thousand population
Norway	9,500,000	1,900,000	680
Sweden	5,000,000	1,675,000	270
France	5,400,000	2,300,000	55
Switzerland	2,500,000	2,300,000	575
Spain	4,000,000	1,000,000	48
Italy	3,800,000	4,840,000	118
Germany	2,000,000	2,000,000	32
Austria	—	800,000	—
Czechoslovakia	—	—	—
Great Britain	900,000	200,000	—
Irish Free State	100,000	100,000	—

1 H.P. = 0.746 Kilowatt.

At first sight the high figures for Spain and Italy seem to negative the statement that water-power resources in Mediterranean

countries, with their summer drought, are low. But most of the power in Spain is from the Pyrenees and Cantabrian Mountains, which belong to the climatic regions of north-western Europe, whilst most of the power in Italy is from the Alps. Before leaving water-power, it should be mentioned that a "saving of six tons per annum is capable of being effected by each installed horse-power," so that the installed horse-power in Europe is equivalent to a production of nearly 100,000,000 tons of coal annually.

(d) *Iron ore.*—Ninety per cent. of all the iron and steel in the world is made in six countries. Approximately half the world's total is produced in the United States, but the other five leading countries—in order, Germany, the United Kingdom, France, Russia, and Belgium—are all European. It must not be assumed, however, that the iron ore is all produced in these five countries. Very broadly, the European iron ore deposits fall into two groups:

(a) The extensive but low-grade bedded ores, which occur associated with sediments, especially of Jurassic age, and which include the Cleveland and Midland ores of Britain and the Lorraine ores of France, Luxembourg, and Belgium.

(b) The high-grade ores occurring mainly as massive deposits amongst the older rocks, including the ores of Sweden and northern Spain.

Great Britain's iron and steel industry was built up to a considerable extent in the first instance on the occurrence of "black band ironstone" in the coalfields. The close association of iron and coal is now no longer a fact. Britain produces about two-thirds of her requirements of ore—mainly from the Cleveland and Midland fields, and from the small but purer haematite deposits of Cumberland and north Lancashire—and so imports large quantities. The demand is mainly for the better quality ores. Large quantities are shipped from northern Spain and Algeria to South Wales; smaller quantities of magnetite—excellent quality ore, suitable for fine cutlery steels—from Sweden, via the Norwegian port of Narvik to the Sheffield district of Yorkshire.

Apart from small quantities mined or quarried in Normandy and the Pyrenees, the bulk of France's iron ore comes from the great Lorraine fields. In 1913 only the Briey-Longwy and Nancy portions lay in French territory; the more important Metz-Thionville area then lay in German territory. In 1913 the latter alone produced over 21 million metric tons of ore—nearly as much as the whole of France at that time. The normal output of the whole Lorraine area (excluding Luxembourg) may be regarded as in the neighbourhood of 40 million metric tons. Actually, in recent years it rose steadily from 13½ in 1921 to 33½ in 1925 and to 43 in 1927; in 1929 the output reached 48 million metric tons but in 1934 fell to 32. The adequate utilization of Lorraine iron ore is intimately bound up with the possession of an adequate supply of

fuel. Especially since the Saar was restored to Germany in 1935 the position is that France has the ore, Germany the fuel. The Lorraine ores are low-grade sedimentary ores with a high phosphoric content.

Apart from the lost Lorraine fields, Germany has considerable deposits of iron ore in Siegerland and Vogelsberg and the Peine and

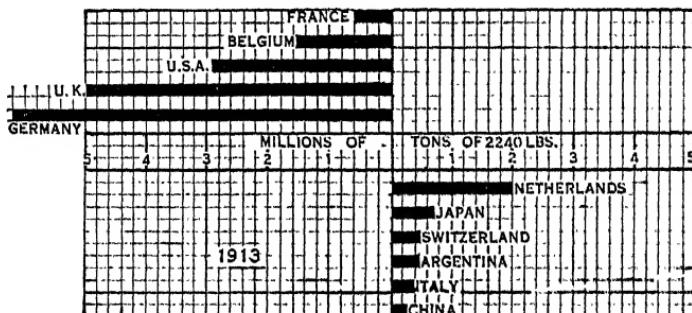


FIG. 10.—World trade in iron and steel, 1913.

Salzgitter areas. These home supplies are totally inadequate, however, to maintain Germany's great iron and steel industry, built up before the war. In 1925 11.5 million tons of iron ore were imported, 7.4 coming from Sweden, 1.4 from Spain, 1.6 from the Lorraine fields. In 1930 14 million metric tons were imported; in 1933 only 4.6. The important Upper Silesian iron-ore field is shared with Poland, but the Austrian deposits now belong to Germany.

Spain is rich in iron ores; the principal areas of production are along the northern coastal strip around Santander and Bilbao, and in the south around Almeria. With a production of good quality iron ore in 1929 of 6.1 million tons (in 1934 only 2.0), the output of

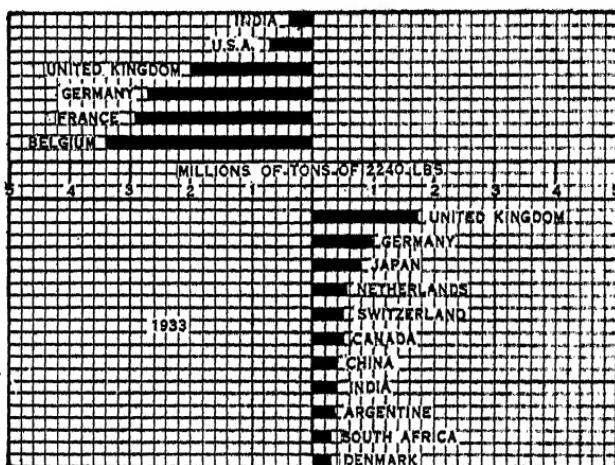


FIG. 11.—World trade in iron and steel, 1933.

iron and steel is less than a million tons, indicating the large export of ore. The ore is sent specially to Britain and Germany.

In the north of Sweden there are several hills consisting of solid masses of pure magnetic iron ore (magnetite). The hills lie in the Gellivara or Norrbotten district, and most of the ore is exported through the permanently ice-free Norwegian port of Narvik. Another iron area lies in southern Sweden (Kopparberg). In 1913, Sweden's output of ore was 7·5 million metric tons, but in recent years the industry has suffered from severe depression and the output in 1928 was only 4·7 million metric tons; it rose, however, in 1929 to 11·5 million metric tons, but fell in 1933 to 2·7 million.

In Luxembourg and the extreme south of Belgium lies the extension of the Lorraine fields. The very important Belgian steel industry is supplied with ore from this area and from France. The industry is concentrated on the Belgian coalfield. Russia has important iron-ore fields in the Donetz basin in the south and in the Tula district of central Russia.

Amongst other European deposits should be noted the very fine Italian iron ore (in limited quantity) from the island of Elba, and the extensive deposits at Eisenerz in Austria (now German).

(e) *Other metals.*—Despite the existence of large areas of ancient rocks Europe is especially poor in the precious metals. Rumania is the only European country in which gold is mined in payable quantities; Germany and Czechoslovakia (Bohemia) have a little silver; the famous platinum deposits of the Urals have recently been eclipsed by discoveries in Rhodesia and South Africa.

Amongst other metals the copper production of Germany is small when compared with world totals; Cornwall is no longer an important producer of tin. Europe occupies a more important position as producer of lead and zinc, yielding more than half the world's total of zinc (Belgium,¹ Poland, France,¹ and Germany), and considerable quantities of lead, mainly from Spain, Belgium, and Germany. The metal aluminium, being very light but strong, has become increasingly important with the rise of the motor-car industry, and its use has been extended in various directions. Although a very common metal in nature, the very high temperatures available in the electric furnace are required in reducing the ores to the metal, and there is a marked tendency for the production of aluminium to be restricted to those countries where hydro-electric power is available—in Germany, Norway, France, Switzerland, Great Britain (Scotland), Austria, and Italy. About a third of the world's output is, however, produced in the United States and Canada.

Climate.—In general, it may be said that a number of factors have a determining influence on the character of European weather and climate. The factors may be grouped as follows:

¹ Smelting rather than producing ore.

(a) The western coasts of the continent are bathed by a warm current—the North Atlantic Drift, which is a continuation of the Gulf Stream. The existence of this warm current, especially round the British Isles, has undoubtedly an important effect in ameliorating winter conditions. But the effect of the warm waters themselves is enormously enhanced by the prevalent south-westerly winds; for it is the warmth communicated through the winds which is far more important than the actual warm current.

(b) According to the modern Norwegian school of meteorology, a very important difference is found between cold Polar air and warm air coming from Equatorial regions. The position and amount of

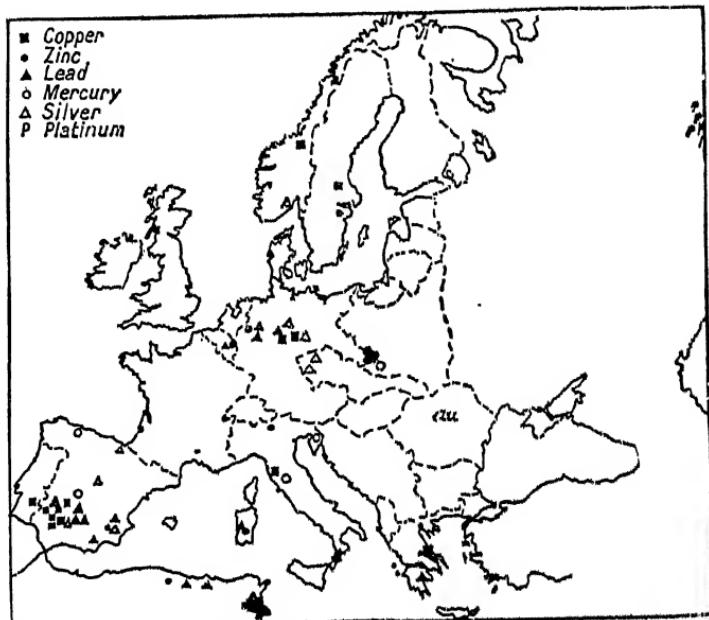


FIG. 12.—Map showing the distribution of non-ferrous minerals in Europe.
(Au in Rumania = gold.)

the cold Polar air, or Polar front, as it is called, varies with the seasons, but it may be regarded as lying to the north of Europe, somewhere in the neighbourhood of Iceland.¹ The currents of warm Equatorial air which reach Europe as the South-west Anti-Trades exert their influences on the remainder of Europe. It is the friction between the current of Equatorial air and the cold Polar air that gives rise to the succession of cyclones which we associate with the Polar front. A continuous succession of cyclones passes across Iceland in a north-easterly direction; and if one takes an average of such conditions, one gets the conception of a semi-permanent

¹ In winter it may be regarded as following very roughly the 32° F. isotherm.

low-pressure system situated approximately, as our weather reports say, off Iceland.

(c) The configuration of Europe, particularly the existence of the Mediterranean Sea and its continuation in the Black Sea, as well as, to a less extent, the existence of the Baltic Sea, permits the penetration eastwards of oceanic conditions much further than would otherwise be the case. So that whereas the Mediterranean Belt in other continents is comparatively small, that around the Mediterranean Sea itself is very extensive in an east-west direction.

We may now consider climatic conditions in Europe by contrasting the winter with the summer.

Winter Conditions.—Owing to the warm currents of the sea and the wind systems, in the winter months the whole of Europe, with the possible exception of Iceland, lies in the belt of the westerly

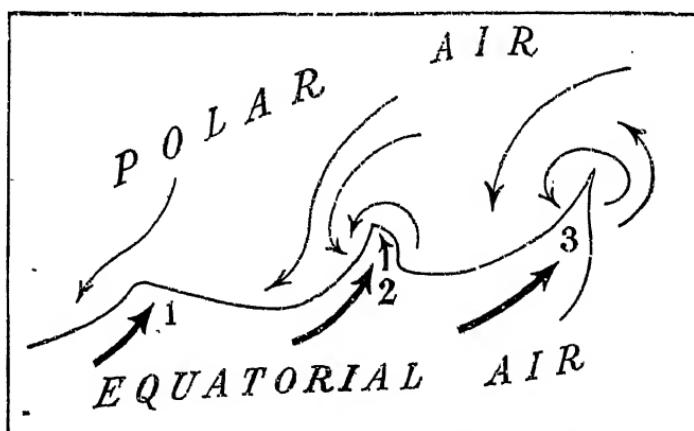


FIG. 13.—The Polar front diagram, showing stages in the formation of a cyclone.

1=incipient; 2=mature; 3=senile or post-mature.

winds, thus enjoying the warm, moisture-laden winds from the Atlantic Ocean. The extra-tropical, high-pressure belt at this season lies well to the south of Europe, over the Sahara and its continuation to the Atlantic, that is, to the south of the Azores. But the eastern part of the continent at this season is very near the great land mass of Central Asia, which gets extremely cold. One may picture a great mass of cold, heavy air centred over Asia and eastern Europe, giving rise to a permanent high-pressure system in the winter. The warm moisture-laden airs from the Atlantic blow up against this as against a wall, and either find their way away to the north-east past the coast of Norway, or they escape to the south along the Mediterranean. At times this great high-pressure system of eastern Europe, with its cold, out-blowing winds, extends its influence even as far as the eastern shores of the British

Isles and gives rise there to spells of cold and frosty, though often sunny, weather. Indeed, it may be said that the winter weather of the whole of Europe is determined by the relative strength or importance of the three great pressure systems : the semi-permanent low-pressure system over Iceland, the permanent high-pressure system over eastern Europe, and the high-pressure system south of the Azores. Bearing these facts in mind, it is not difficult to understand why in the winter months it gets steadily colder as one travels eastwards in Europe, and that the isotherm of 32° , or freezing-point, divides the continent roughly into two halves. Nor is it difficult to understand why the whole of the western and

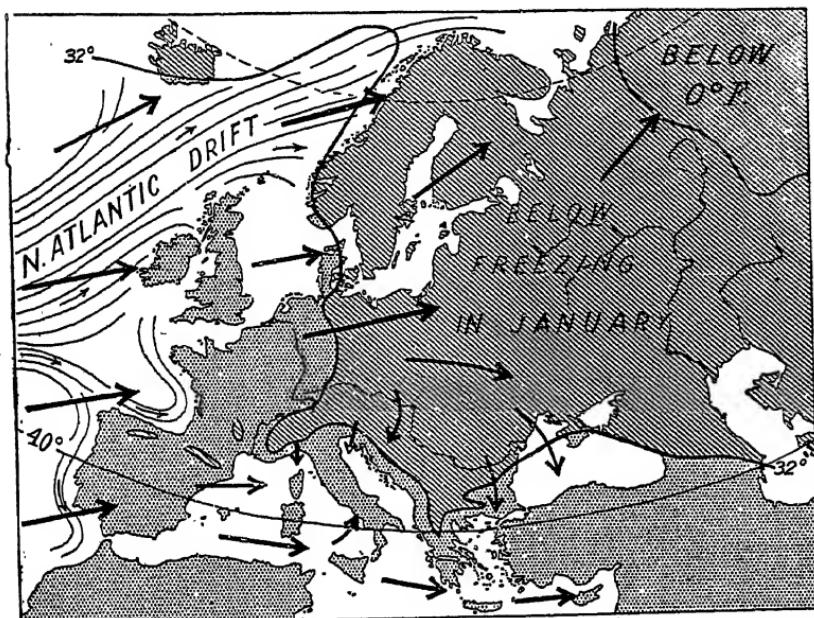


FIG. 14.—Climatic conditions—winter. Average surface temperatures are shown, not sea-level isotherms.

Mediterranean margins receive a considerable proportion of their rain in the winter (more than half the total in the west of the British Isles, western France, and the Mediterranean), whereas as the result of the cold, out-blowing winds, precipitation of any sort is less in eastern Europe in winter than in summer.

In western and southern Europe most rain falls where there are mountain ranges to intercept the winds; and the rainfall map of Europe is thus a very complex one, owing to the numerous small mountain ranges.

Summer Conditions.—At this season the wind systems of the world have moved to the north, so that only the northern part of

Europe is under the influence of the Westerlies or the South-west Anti-Trade winds. The southern part of Europe—namely, the countries surrounding the Mediterranean Sea—lies within the influence of the high-pressure belt which surrounds the globe just outside the Tropics. The high pressure reigning in the summer months over the Mediterranean prevents the penetration of the cooling or rain-bearing winds from the Atlantic Ocean; consequently the Mediterranean lands suffer from considerable heat, and

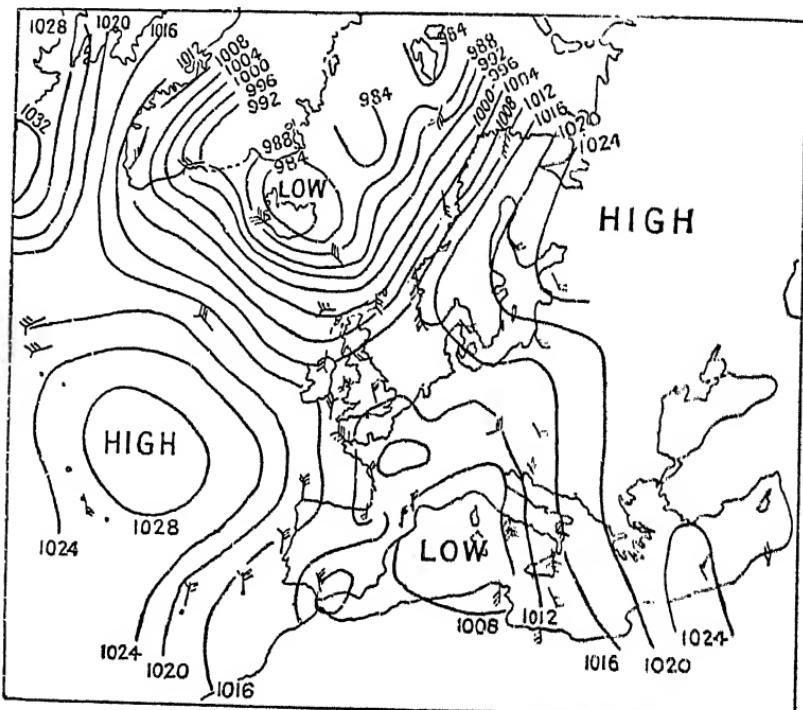


FIG. 15.—Weather conditions on Thursday, February 19, 1931.

This weather chart shows typical winter conditions with a high-pressure system over eastern Europe; a "high" over or near the Azores; and a marked depression or "low" over Iceland. A characteristic small depression is passing over the Mediterranean.

comparative or even complete rainlessness—the typical Mediterranean climate. In the Atlantic the high pressure centre of the Azores, which forms part of this belt of high pressure, is north of its winter position, and frequently extends its influence as far as the British Isles. On the other hand, the Polar front is farther to the north, and the belt of cyclones which is associated with it tends to lie rather to the north of the island of Iceland, and to affect such regions as the British Isles far less than in the winter.

In eastern Europe the conditions of winter are reversed. The great continental land mass becomes greatly heated, and a large

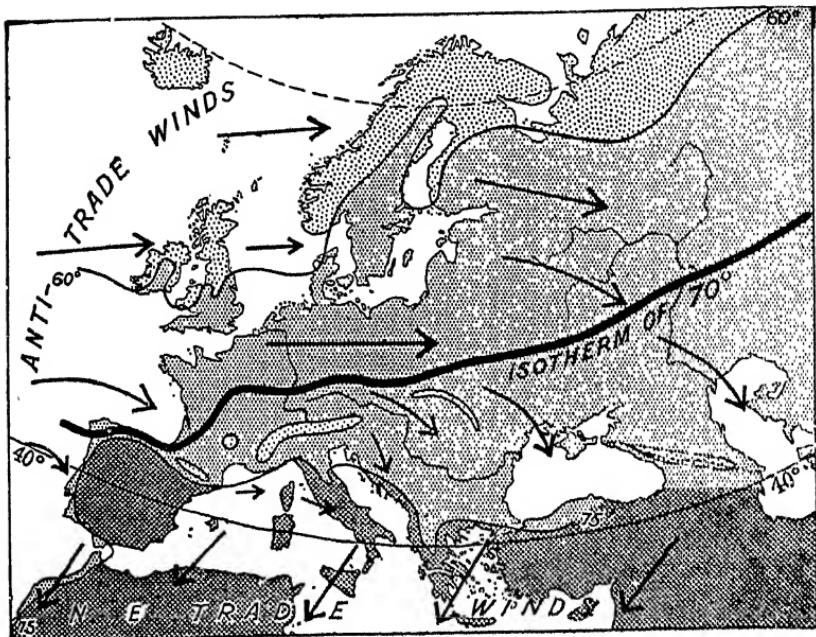


FIG. 16.—Climatic conditions—summer. Average surface temperatures.

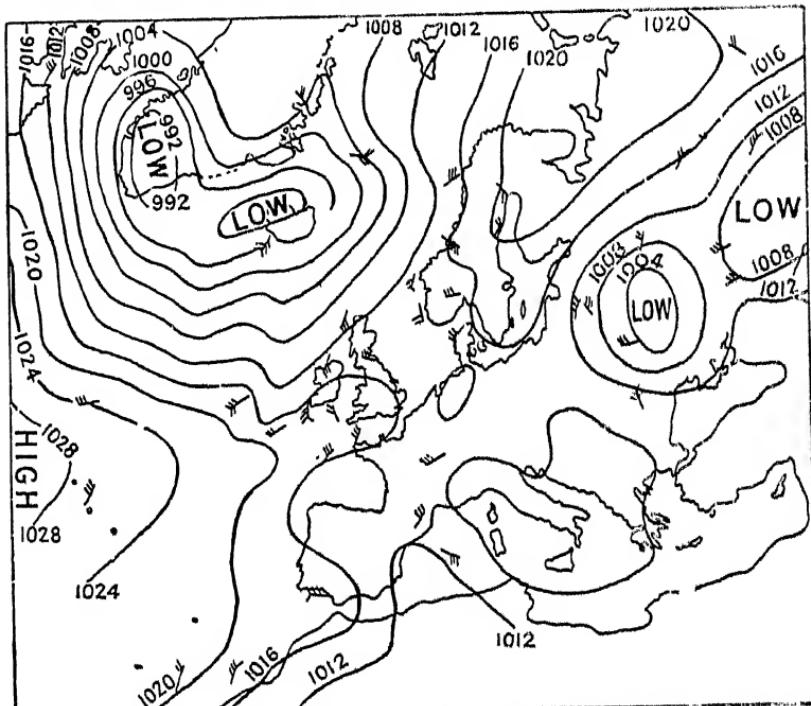


FIG. 17.—Weather conditions on Saturday, July 5, 1930

This weather chart shows typical summer conditions with low-pressure systems over Iceland and eastern Europe and a "high" over the Azores.

low-pressure area is the result. There is a tendency for the low pressure to be particularly marked over southern Russia, and towards this area the rain-bearing winds from the Atlantic blow, and result in the light spring rain of the steppelands of south-eastern Europe. Most of central and eastern Europe thus have the greater part of their rain, that is to say, more than half their

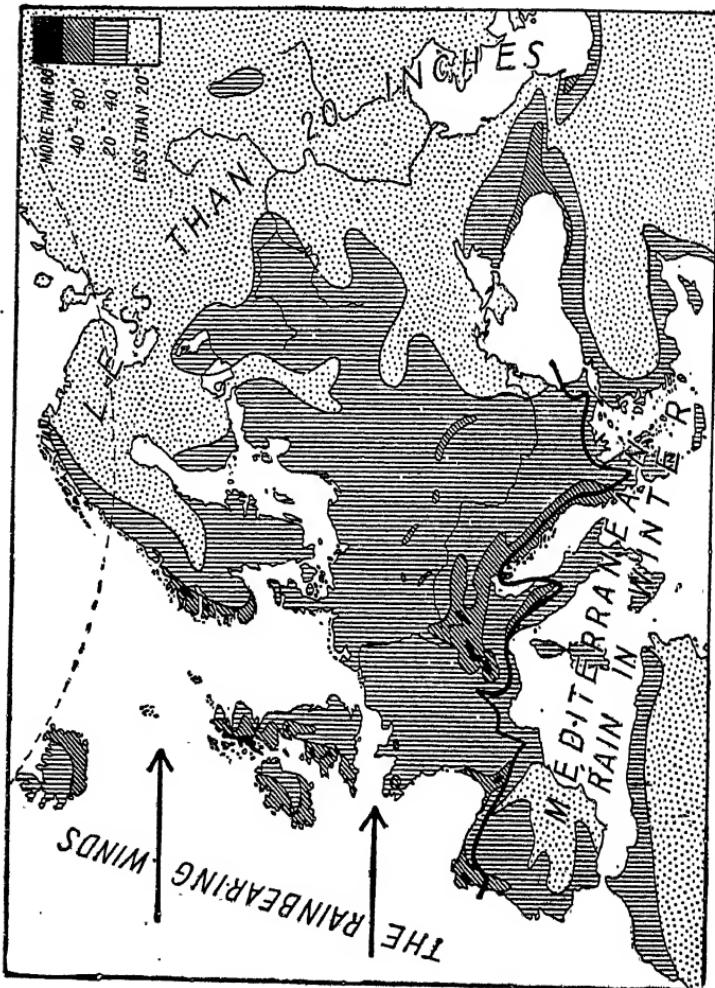


FIG. 18.—Rainfall map of Europe for the whole year.
The thick black line marks the northern limit of the Mediterranean region.

annual amount, in the summer half of the year rather than in the winter.

The south-westerly winds do not blow steadily, but travel across the continent rather as a succession of cyclones and anti-cyclones, which characterize the whole of the westerly wind belt. Thus the rainfall of Europe brought by these winds is partly orographical, partly cyclonic in its origin; with the result that,

although the rainfall on the mountains is nearly always heavier than on the lowlands, even as far from the Atlantic as south-eastern Europe the rainfall is sufficient for agriculture, only in the south of Russia surrounding the Caspian dropping below the essential amount for agriculture.

Climatic Regions.—The continent of Europe includes five of the great climatic regions of the world :

- (a) The Mediterranean.
- (b) The Cool Temperate Oceanic.
- (c) The Temperate Continental or Temperate Grasslands.
- (d) The Cold Temperate or Coniferous Forest.
- (e) The Tundra.

Owing, however, to the increasing severity of the winter as one passes eastwards in Europe, the Cool Temperate Oceanic can easily be divided into three sub-divisions :

(a) North-western Europe, with its mild winters, having everywhere a temperature of over 32° on an average in the coldest months, and cool summers.

(b) Central Europe, where the winters are colder, the average for the coldest month being below freezing, and the summers warmer.

(c) Central Russia, where the winters are very cold, and the summers hot, but where the rainfall is sufficient to give rise to the same deciduous forests that characterize north-western and central Europe.

These divisions are shown in Fig. 21.

It is not easy to define climatically the southern limits of the Cold Temperate type of climate, but usually to the north of the dividing line the average temperature of one month only rises above 60° , whilst the length of the summer is insufficient for the growth of the cereal wheat. Moreover, the dividing line chosen is the all-important division between the Coniferous Forest or Taiga, and the Deciduous Forest.

Natural Vegetation and Soils.—It has gradually come to be realized that the soils of Europe are determined much more by climatic conditions than by differences in underlying geological formations. This is particularly well seen in the wide, open lowlands of Russia, where the Russians have led the world in the modern science of soil study. This matter will be referred to again when we deal with Russia.

In studying the natural vegetation of Europe it must be remembered that so much of the continent is densely populated, and has been densely populated for many generations, that but little of the natural vegetation remains. It is possible however, to distinguish the following broad major divisions.

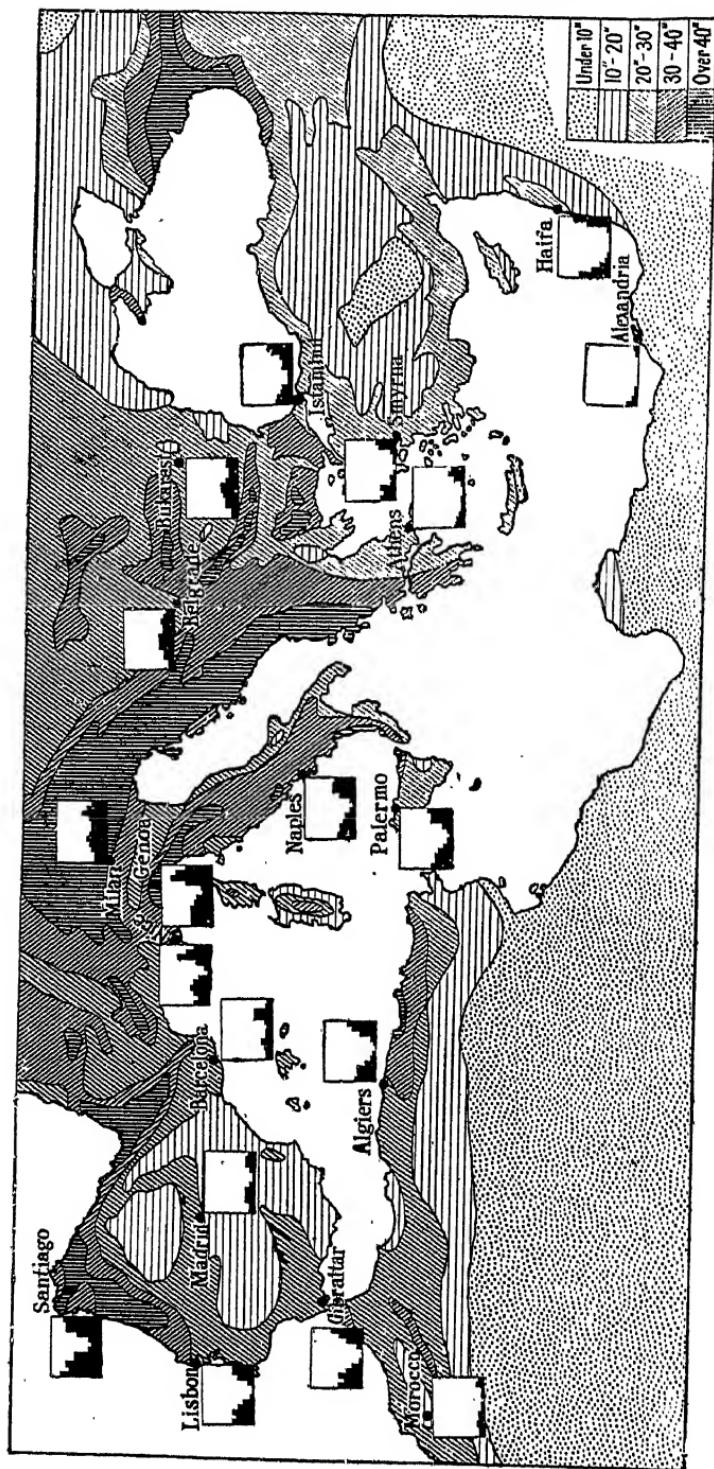


FIG. 19.—Annual rainfall of the Mediterranean region.
The graphs showing the rainfall for each month of the year from January to December illustrate the essentially winter rainfall of the Mediterranean region and should be contrasted with the graphs shown on FIG. 20.

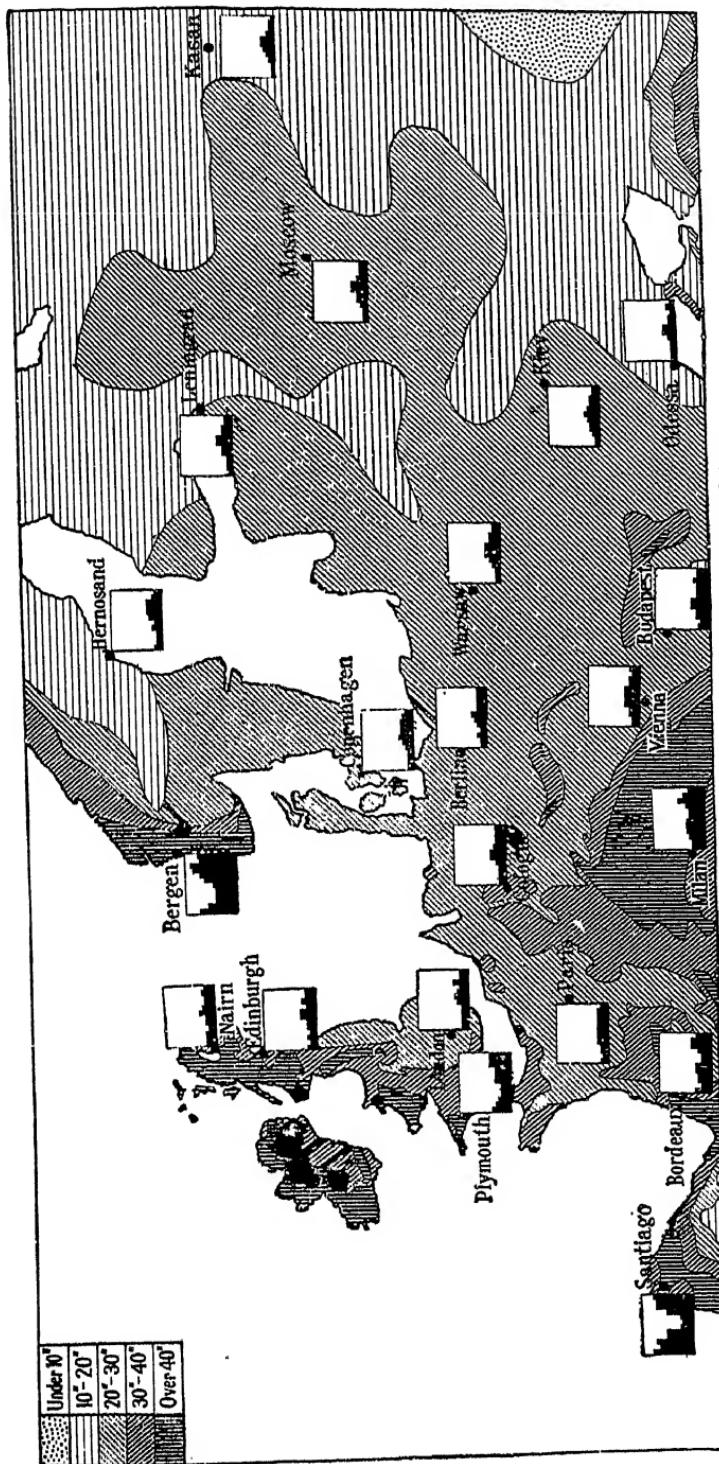


FIG. 20.—Annual rainfall of the North European Plain.
On the western margins it is notable that the heavier rainfall is in the winter; eastwards the rain-bearing winds do not penetrate during the cold season owing to the high-pressure system over eastern Europe, hence in central and eastern Europe the rainfall is mainly in summer.

(1) *The Mediterranean Region.*—Mediterranean climate is characterized essentially by its cool, moist winters and its hot, dry summers. In such a climate, where the hot seasons and wet seasons do not coincide, soil forms but slowly, and it is only in local patches of alluvium that, broadly speaking, one finds rich soil in Mediterranean lands. Moreover, the young fold mountains which play such a prominent part in forming the topography of Mediterranean lands are composed to a very considerable extent of hard limestones, which tend to give only a poor, thin, red soil. As any visitor to Mediterranean lands will know, whether he travels along the east coast of Spain or merely visits the Riviera of France, or journeys



FIG. 21.—Climatic regions of Europe. (After Kendrew.)

amongst the mountain complexes of Greece or along the hill country of Palestine, extensive patches and outcrops of bare rock are the rule rather than the exception. The natural vegetation of Mediterranean lands, therefore, has to overcome not only the difficulties of the climate, when the moisture is available in the winter and spring but not in the summer, but also has to overcome the difficulties of poor soil. The resulting vegetation is essentially woody rather than herbaceous; and may vary from the low scrubland, or maquis, through Mediterranean woodland, in which the trees are characterized by protective devices against the loss of moisture, to, in the wetter and more favoured parts, forests of such trees as cork oak, and pines, where the protective measures, though still taken, are

less obtrusive. It is interesting to notice that the reduced leaf surface afforded by the needle-like leaves of the Aleppo pine is equally effective against the hot summer conditions of the Mediterranean, as are the similar needle-like leaves further north, which are adopted as a protection against the extreme cold of the Cold Temperate climate.

(2) *The Cool Temperate Oceanic Climatic Region*, including the subdivisions of north-western and central Europe, and central Russia. With the cooler, and by no means rainless, summers, when vegetative processes can go on, the principal vegetation of this region is the Deciduous Forest : forest, because the rain throughout the year maintains a deep-seated water supply fitted rather to trees than to

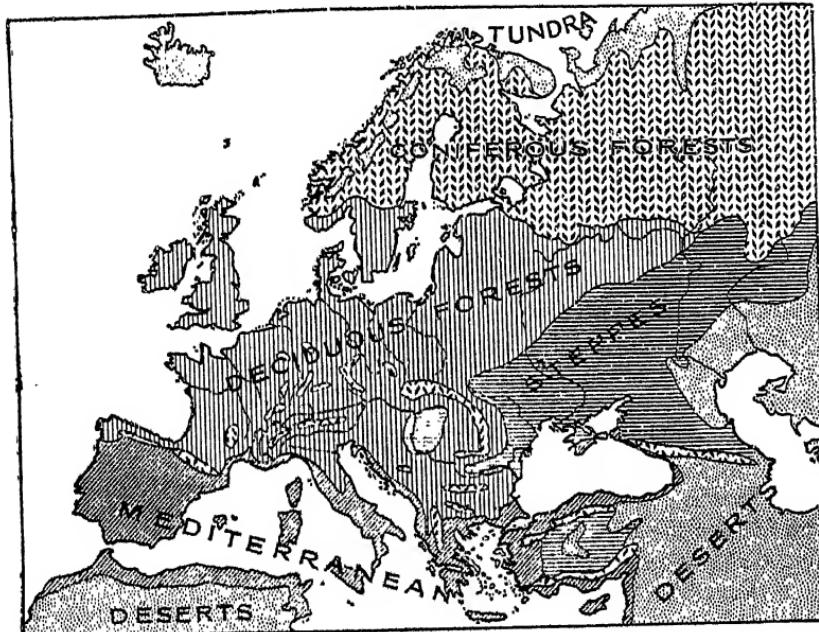


FIG. 22.—The natural vegetation of Europe.

grass ; deciduous, because the cold of the winter provides a good resting season. Wherever increasing severity of conditions is apparent, whether as a result of poorness of soil or of increasing elevation, there is a marked tendency for the deciduous forest to be replaced by coniferous forest ; hence the large patches of coniferous forest associated with all the major mountain areas, and with such areas of poor soil as the sandy tracts of the Landes in France, or of the heathlands of southern England. It should be noted that deciduous forest tracts are associated with fine, rich, dark-coloured soil, the colour of which is due to the humus, or decayed vegetable matter resulting from the leaf fall taking place every autumn. The actual formation of soil from the weathering of rocks is considerably

more rapid than in Mediterranean climates, and is hastened by the never-ceasing work of the earth-worm, which is particularly active in these humic soils of temperate lands. Where cleared, the deciduous forest tends naturally to be replaced by the rich, green, grassy meadows so characteristic of the British Isles. The climate is sufficiently moist throughout the year to permit the grass to remain green ; in Britain, at least, the heat or drought of the latter part of the summer is rarely sufficiently intense or prolonged to cause the whole countryside to become dry and brown. It must be remembered, however, that large tracts of the Deciduous Forest belt in Europe have probably never been forested, e.g. some sandy tracts seem naturally to be covered with heathland and moorland.

(3) *The Northern Coniferous Forest Region.*—This region stretches as a broad belt across the north of Europe, through Norway and Sweden, nearly the whole of Finland, and across the north of Russia. In these northern latitudes soil forms slowly, and, in addition, the complex of ancient rocks which underlies much of this tract does not furnish material readily available for soil formation ; the whole area was swept bare of loose deposits and soil by the great ice sheet—and these three factors combined have resulted in large areas of poor, sterile soil. Nor is it enriched by leaf mould in the same way as it is in the deciduous forests, so that the light, siliceous soils of the Northern Coniferous Forest form a well-marked type known as *podsols*. Except in favoured hollows where glacial débris forms better soils, there is comparatively little agriculture possible. Moreover, the climatic conditions do not favour arable farming, and, in particular, very little cereal farming is possible. These northern regions, therefore, remain comparatively thinly populated, and forests cover very large areas. In these forests two trees are predominant—the Norway spruce, *Picea excelsa*, and the Scots pine, *Pinus sylvestris*. The latter occurs especially in the sandier and lighter soils, the *Picea* especially in damper regions. The darker foliage of the spruce and the pine is relieved in some of these forests by the silver birch. As we go northwards into Polar regions, so the growth of forest trees is slower. It takes about 50 or 60 years for a forest that has been cut over to regenerate in the southern tracts ; towards the northern parts of this belt, the growth is so much slower that it takes about 200 years for a tree to grow sufficiently large to be cut.

(4) *The Tundra Region.*—In the extreme north of Russia and of Norway one comes into those regions which are beyond the Polar limit of tree growth. Similar conditions are reached in the higher parts of the mountain divide between Norway and Sweden. A low scrub or woodland usually occurs beyond the limit of the Northern Coniferous Forest, but in the Tundra proper the ground is simply covered by a thick growth of lichens, of which the so-called “ rein-

"or moss" is the most important constituent, together with a large proportion of mosses, and usually a number of low bushes, six inches a foot high, of dwarf birch, *Betula nana*. In places, however, the tundra regions are occupied by surprisingly rich meadow lands. A number of herbaceous plants and grasses are able to take advantage of the very long summer days, since one must remember that as soon as one is inside the Arctic Circle there is at least one day in a year on which the sun never sets.

(5) *The Steppelands of South-eastern Russia*.—In south-eastern Russia, with its late spring and early summer rainfall and its cold winters, the conditions are ideal for the growth of grass, but inimical to the growth of trees; so here we have the low, treeless, rolling assy plains known as the Steppes. They occupy the whole of the southern portion of Russia in Europe, with the exception of the Mediterranean fringe of the Crimea, the desert surrounding the Caspian, and the mountainous belt of the Caucasus. They stretch some distance to the south-west into the plains of Rumania, whilst the Great Hungarian Plain may be regarded as an outlier of the main belt. The wide, open, rolling plains of the Anatolian plateau and Asia Minor are intermediate in character between the Russian steppelands and the Mediterranean vegetation. They are for the most part treeless, except near the water-courses, but instead of a luxuriant growth of grass one finds a number of the smaller plants and flowers (especially in the spring) that one associates more particularly with Mediterranean regions.

(6) *The Temperate Desert*.—Very, very dry steppelands fading into desert country occur in Russia round the northern fringe of the Caspian Sea. The desert is partly climatic, with a low rainfall, partly *edaphic* (or, due to soil), owing to the large proportion of salt in the soil where one approaches the great salt lake of the Caspian Sea itself.

Forests of Europe.—We in England are apt to get a very wrong impression of the general European timber position. The United Kingdom is in the anomalous position of having the smallest proportion and the smallest area *per capita* of forest of any country in Europe. Only about 3·9 per cent. of the surface of Great Britain and Ireland is covered with forest, against an average for Europe of 31 per cent. This is equivalent to only one-tenth of an acre per inhabitant, against an average in Europe of nearly 1½ acres. The bulk of our requirements of timber of all kinds is imported, and in the years immediately preceding the war over 25 per cent. came from Canada and the United States. In other European countries the position is entirely different. Very broadly speaking, Europe may be regarded as self-sufficing in the matter of timber—that is, production roughly equals consumption in Europe as a whole. The annual output of the continent is about

17,000,000,000 cubic feet. There is thus comparatively little inter-continental trade between Europe and the other continents (the British-American trade is the principal exception), but there is a very large trade between the countries of Europe. It may be argued that since Europe has no tropical forests, there must be a large import of this class of timber. Here it is necessary to remember that out of all the saw-timber used in the world, roughly 80 per cent. is softwood, about 18 per cent. temperate hardwood, and only about

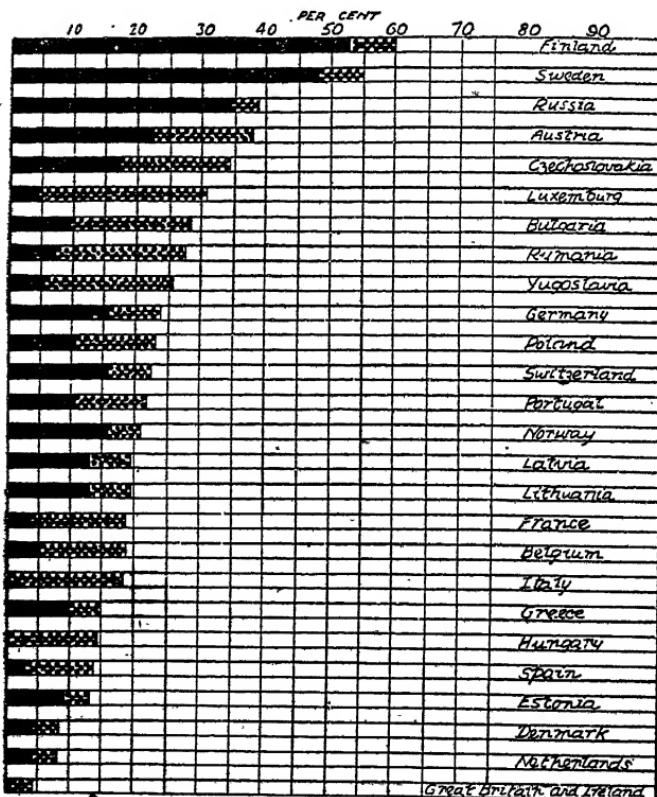


FIG. 23.—Diagram showing the proportion of the surface occupied by forest in the chief countries of Europe.

In black, coniferous forest; dotted, deciduous (hardwood) forest.
(From Stamp, *Empire Forestry Journal*, 1929.)

2 per cent. tropical hardwood. Much of the tropical timber is consumed in the countries of production, and but a small proportion enters into world trade.

According to Zon and Sparhawk, Europe has 10.3 per cent. of the world's forest area. Nearly three-quarters of this total is coniferous forest, the remainder temperate hardwood forests (except 1.6 per cent. of mixed forests). This gives Europe 22 per cent. of

ie world's coniferous forests and 16 per cent. of the world's temperate hardwood forests.

Even before the war there were few European countries where growth exceeded cut. The position of Germany, Poland, Hungary, and Rumania is doubtful, and it is at least very near the truth to say that the U.S.S.R. is the only country where forests are not being depleted more rapidly than should be the case.

The depletion mentioned in the last sentence is taking place both in those countries where the need for supplies for home consumption is urgent, and also in those countries which rely upon timber as an important export. Countries which, on the balance,

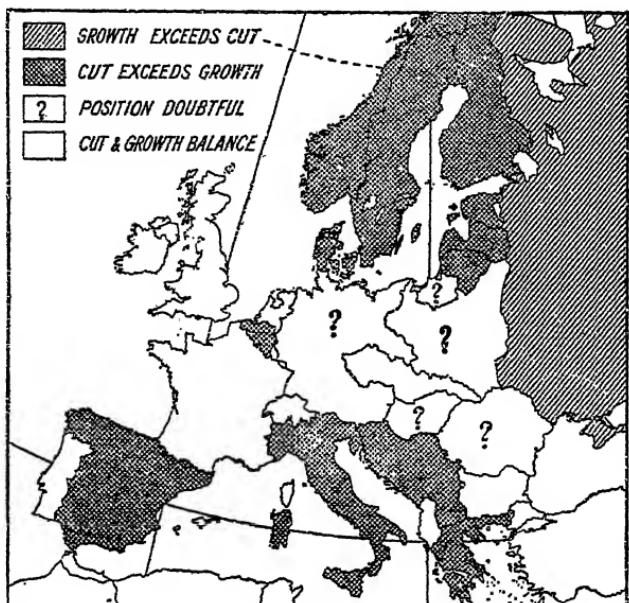


FIG. 24.—The present forestry position in Europe, showing that Russia is the only country in a strong position.

are importers of timber, include the United Kingdom, France, Spain, Belgium, Holland, Germany, Denmark, Estonia, Switzerland, Italy, Hungary, Greece, and Bulgaria. It will be seen that, with the exception of Portugal, the exporting countries fall into two groups :

(1) Those which share in the great belt of northern coniferous forests—Russia, Finland, Norway, and Sweden ; to a smaller extent, Latvia and Lithuania.

(2) Those which share in the forests clothing the great mountain chains of Central Europe—mainly the Alps and Carpathians (Austria, Czechoslovakia, Poland, Rumania, and Yugoslavia).

The question of trade between the countries of Europe is one of special interest, and there are only eight important exporters of

timber. In order of importance they are Finland, Sweden, Poland, Russia, Norway, Czechoslovakia, Austria, and Rumania. The greatest potential exporter, however, is Russia.

Agriculture in Europe.—Excluding for the moment any consideration of Russia, there are certain features common to nearly the whole of Europe in matters relating to agriculture.

(1) No European country can produce all the foodstuffs and raw materials essential to modern civilized existence, for the simple reason that the whole continent lies in temperate latitudes.

(2) Further, the industrialized or densely populated regions are unable to produce sufficient of the staple foodstuffs for the sustenance

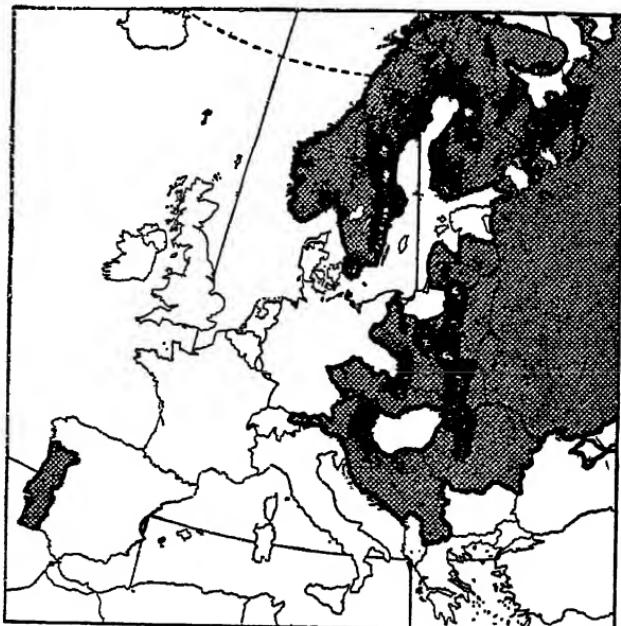


FIG. 25.—Map showing the countries of Europe (dotted) which are exporters of timber.

of the people, and large quantities must of necessity be imported. It follows almost automatically that such foodstuffs as are produced are grown under conditions of "intensive farming," with the characteristic features of mixed arable and pastoral farms, rotation of crops, manuring, high yields per acre. It follows, too, that there is essentially a specialization in the more paying crops—in other words, the actual produce of agriculture is determined by economic rather than geographic factors. Denmark is famous for bacon and butter not because the geographical conditions are pre-eminently suitable but because of a specialization undertaken for economic reasons.

(3) It follows that the geographical factors determine the broad belts wherein the cultivation of any specified crop is possible, the actual areas where cultivation is undertaken are determined by economic factors.

Agriculture in Russia will be considered later. The main difficulty is the instability of the present position. Before the war Russia was the world's largest exporter of wheat, barley, oats, rye, flax, and hemp, and second in butter. In the war and post-war years the exports entirely disappeared, and Russia's place was

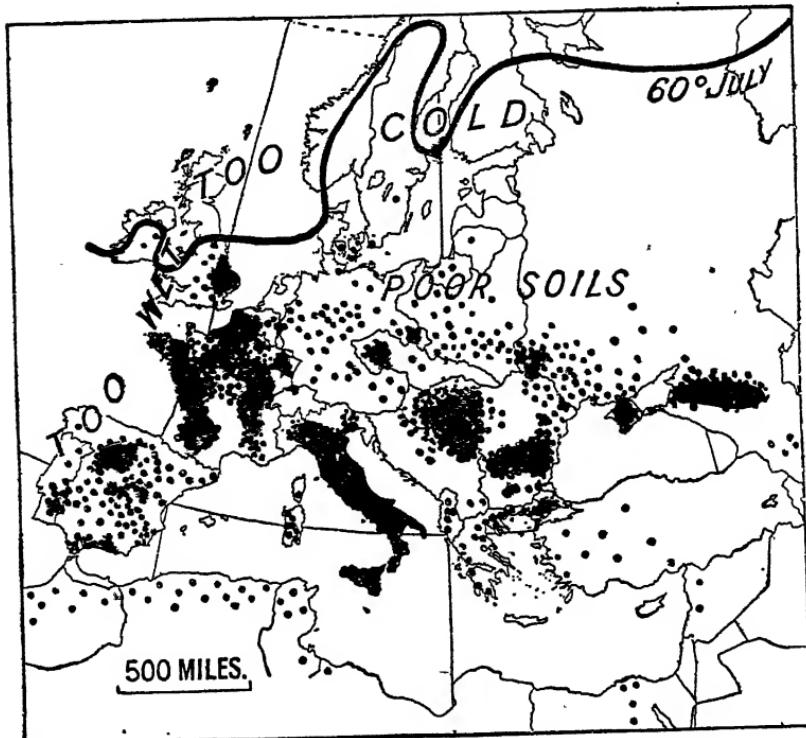


FIG. 26.—Winter wheat in Europe and the Mediterranean lands.

taken by such new countries as Canada, Argentina, and Australia. There are signs that Russia may regain part of her export trade.

Certain leading crops and domestic animals will now be considered from the point of view of their distribution in Europe.

Wheat.—When one thinks of the vast wheatfields of Canada, the United States, the Argentine, and Australia, it is at first surprising to realize that the small countries of Europe, *excluding* Russia, grow roughly one-third of all the wheat of the world, and far more than North America. But the grain is nearly all grown for home consumption; in 1934 only Hungary, Rumania, Yugoslavia,

Bulgaria, and Poland (countries which share the geographic conditions of the Russian steppes), had a surplus available for export. On the other hand, with the exception of Brazil an

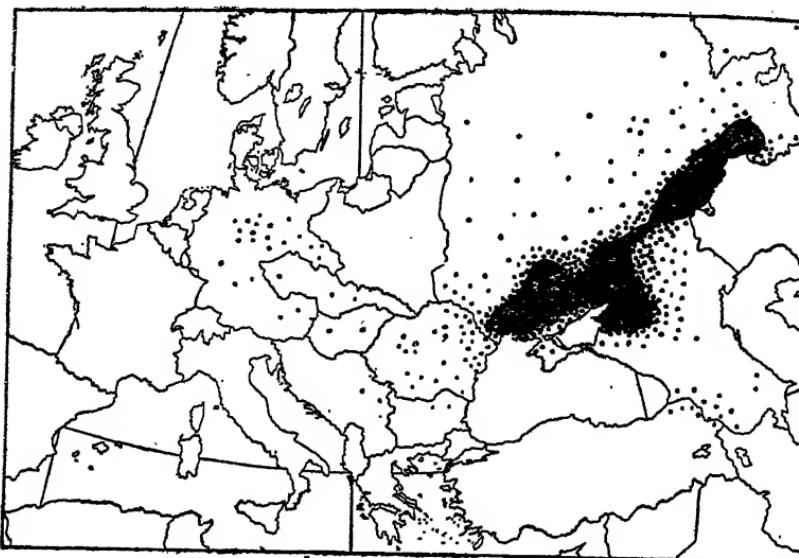


FIG. 27.—Spring wheat in Europe.

Japan and lately China, all the big importers of wheat are European countries—easily led by Great Britain.

A glance at the two maps showing wheat in Europe and North

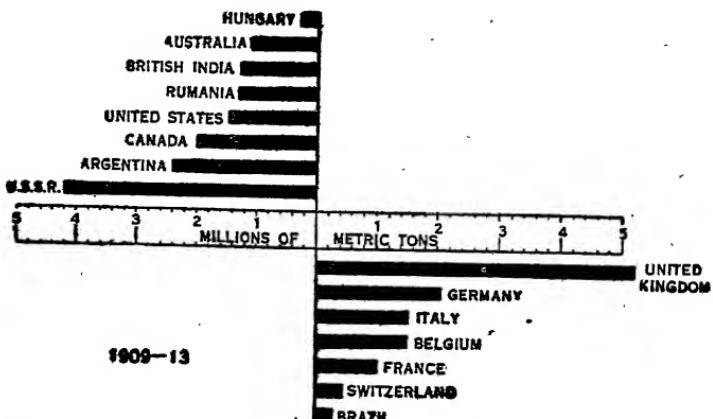


FIG. 28.—Wheat trade of the world, 1909-13—principal exporting countries (above) and principal importing countries (below).

Africa shows that the cultivation of spring wheat is practically confined to the steppelands of Russia, with their severe winter

conditions. The remainder of Europe grows winter wheat. The map showing its distribution illustrates rather well what may be called the limiting factors in its cultivation.

(a) To the north there is little grown beyond the July isotherm of 60° F.—beyond this the summers are too short or too cold.

(b) There is an obvious absence of cultivation in mountainous regions such as the Alps and Carpathians.

(c) Excessive moisture is the obvious deterrent factor in hilly, western Britain and north-western Spain.

(d) Poor soil conditions are in the main responsible for the sparse cultivation in the North European Plain through Germany and Poland.

The most suitable regions for wheat in Europe are thus the drier,

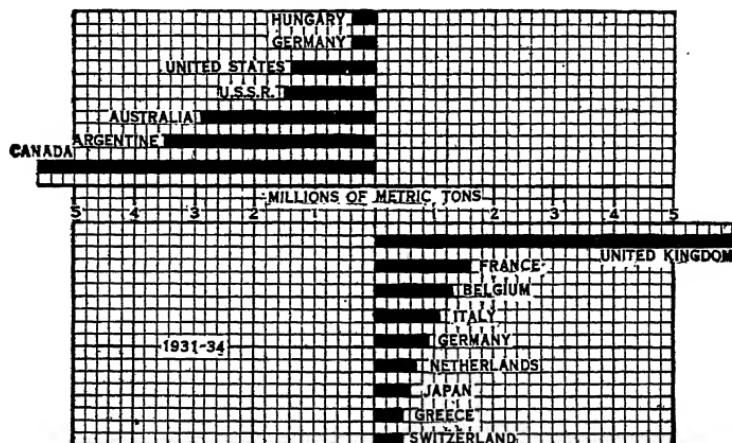


FIG. 29.—Wheat trade of the world, 1931-34.

warmer parts of the Cool Temperate region, the more fertile areas of the Mediterranean region, and the Temperate Continental or Steppe region.

Rye.—Rye is wheat's poor relation. It grows best with the same conditions as wheat, but is actually grown where soil and climatic conditions are not quite good enough for wheat. Notice its concentration on the poor soils of Germany, Poland, and Russia; its absence from the Mediterranean, where, if the soil is good enough, the climate favours wheat.

Oats.—Oats demand roughly the same conditions of soil and climate as wheat, except that they will ripen under conditions of greater moisture and less sunshine, but will not flourish under dry, sunny conditions. Hence oats are almost absent from the Mediterranean and Steppeland regions, but are more widespread over

northern Europe. Although the trade is small when compared with that in wheat, it is again the thickly populated, industrialized

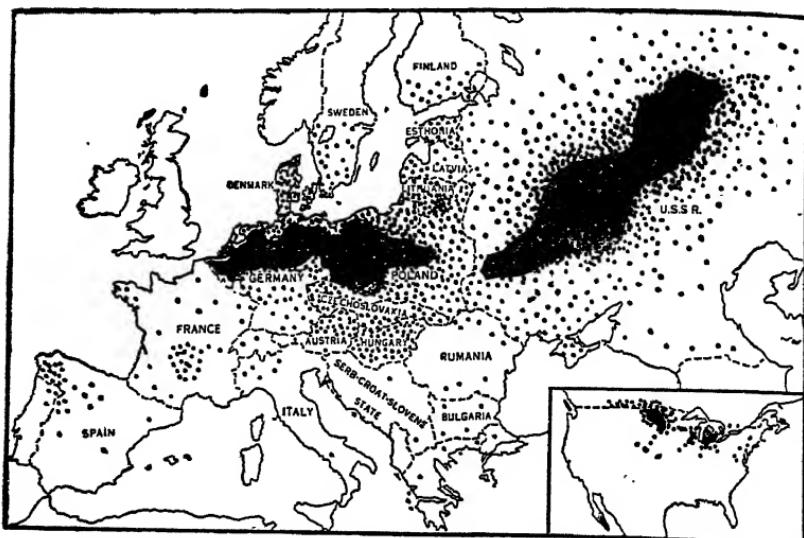


FIG. 30.—Map showing principal rye-growing regions of Europe.

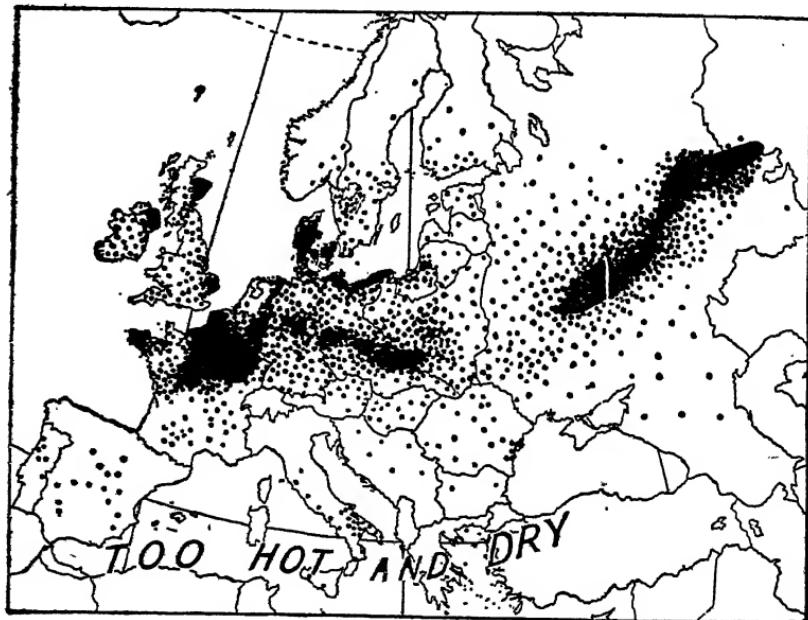


FIG. 31.—Distribution of oats in Europe.

countries of Europe which purchase, the new countries of the other continents which supply. Oats have an important function as the great fodder grain of the dairy regions round the Baltic Sea. It

is only in Scotland and Scandinavia that oatmeal and porridge are important items of human diet.

Barley.—Barley is a grain which again appreciates the same conditions as wheat, but which avoids the damp, sunless lands possible for oat cultivation, and seeks, above all, sun. Barley is able to utilize the long, sunny days of the northern summer, even when that summer is very short, and so it is found ripening within the Arctic Circle, whilst flourishing also in the bright, sunny lands

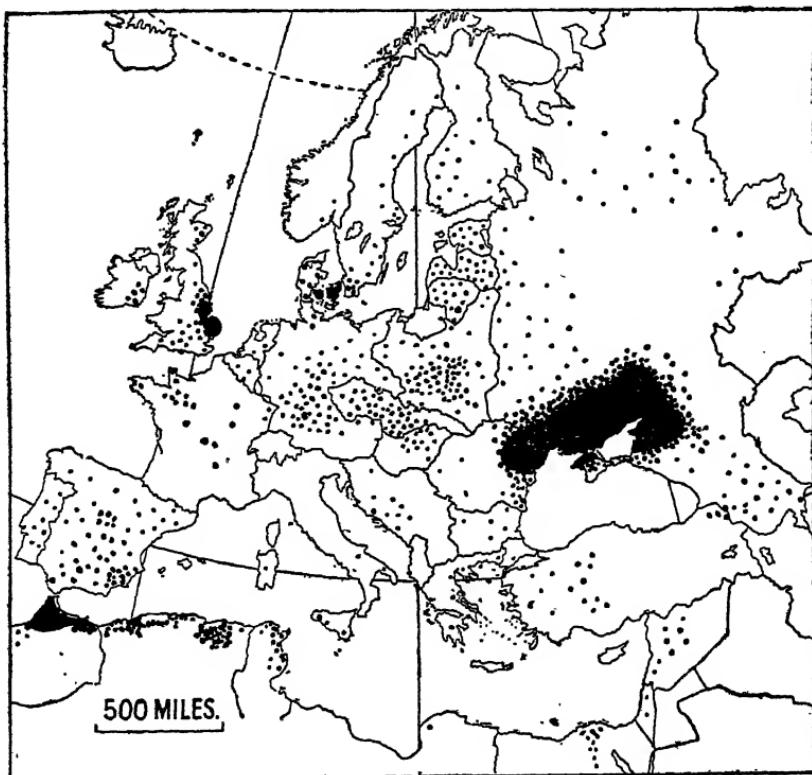


FIG. 32.—Distribution of barley in Europe and the Mediterranean lands.

of North Africa. In North Africa barley is a staple food grain; in northern Europe malting barley for the preparation of beer becomes of great importance. Indeed, the chief purchasers of barley are the great beer-drinking nations—Britain, Germany, Holland, and Belgium.

Maize.—The distribution of maize cultivation in Europe illustrates the need of this grain for warmth and moisture. Very little is grown north of a line which marks the position of the 70° F. isotherm for July (contrast wheat), whilst very little is grown in the dry, sunny Mediterranean region. Notice from the map the regions which lie between these limits.

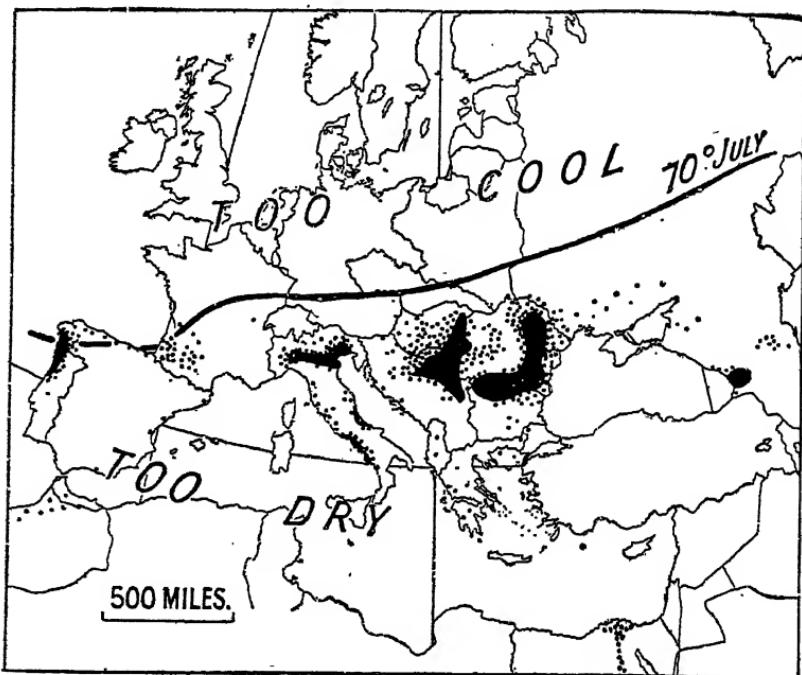


FIG. 33.—Distribution of maize.

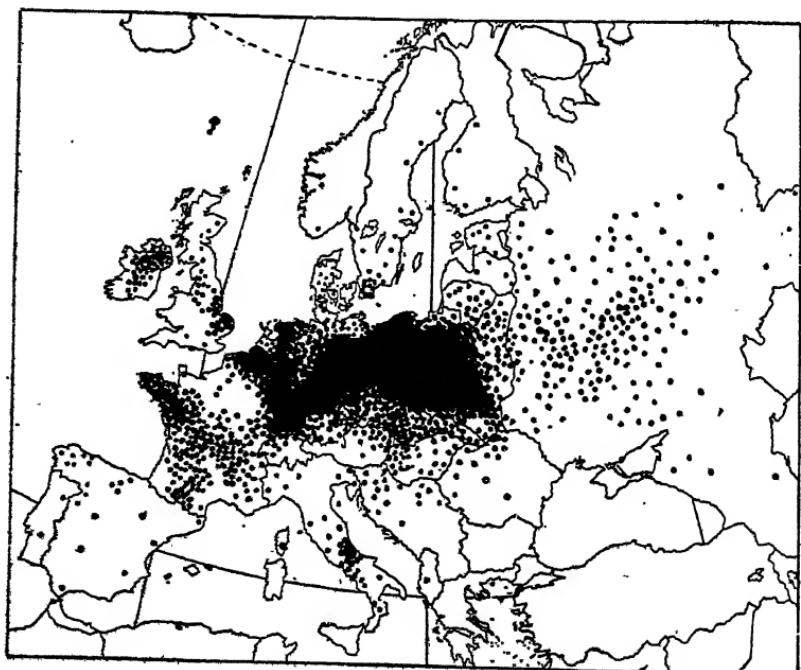


FIG. 34.—Distribution of potatoes.

Potatoes.—The potato prefers rather light soils, well drained, in regions with a cool temperature and well distributed rainfall.

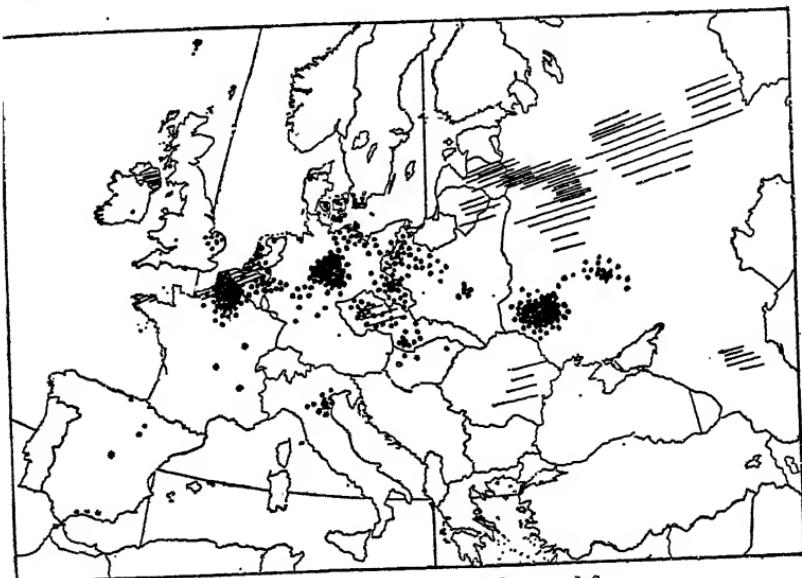


FIG. 35.—Distribution of sugar beet and flax.
Sugar beet is shown in black and by dots; flax is shown by lines.



FIG. 36.—Map showing the wine-growing countries of Europe, with the names of the most important types of wine produced.

Hence the similarity in distribution to rye, in the light glacial soils of the North European Plain.

Sugar Beet may be specially noted because of its concentration

in certain areas and certain areas only—determined partly by the presence of rich, deep, stoneless soils (e.g. Fenlands of England), partly by economic considerations. Similarly, flax is curiously limited in its distribution—largely owing to labour requirements—to the countries bordering the Baltic on the east.

The vine favours dry, sunny positions—hence the Mediterranean

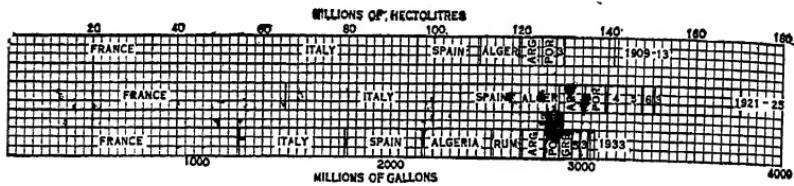


FIG. 37.—Wine production of the principal countries.

concentration; but it will grow in the warmer parts of the North-west European climatic region (e.g. in France).

The olive may be said by its distribution almost to define the area which enjoys a true Mediterranean climate, whereas oranges and lemons, though regarded as equally Mediterranean, are restricted to a few main areas—oranges to the Valencia district of Spain, the

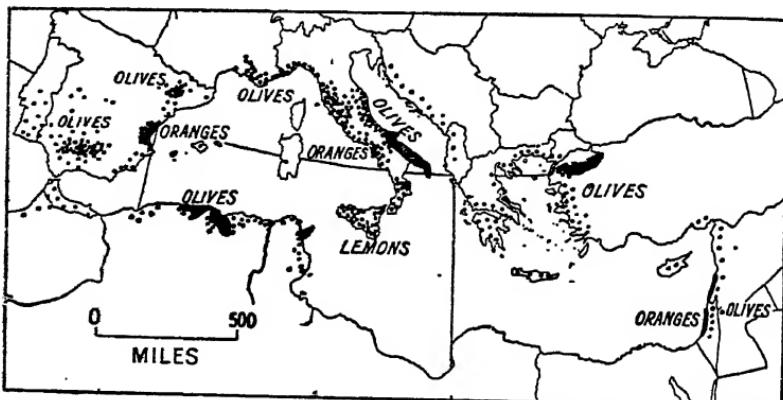


FIG. 38.—Distribution of citrus fruits and olives in the Mediterranean countries.

Naples district of Italy, and the Jaffa district of Palestine; lemons to Sicily.

Animals.—Turning now to the distribution of domestic animals in Europe, it is noteworthy that horses are the plough and draught animals of northern Europe and the steppelands: mules and asses of Mediterranean Europe. Cattle are especially important on the wetter pasture lands of north-western Europe, whilst there is a very definite concentration of dairy cattle in certain countries and areas—such as Holland, Denmark, and Brittany. Pigs are concentrated

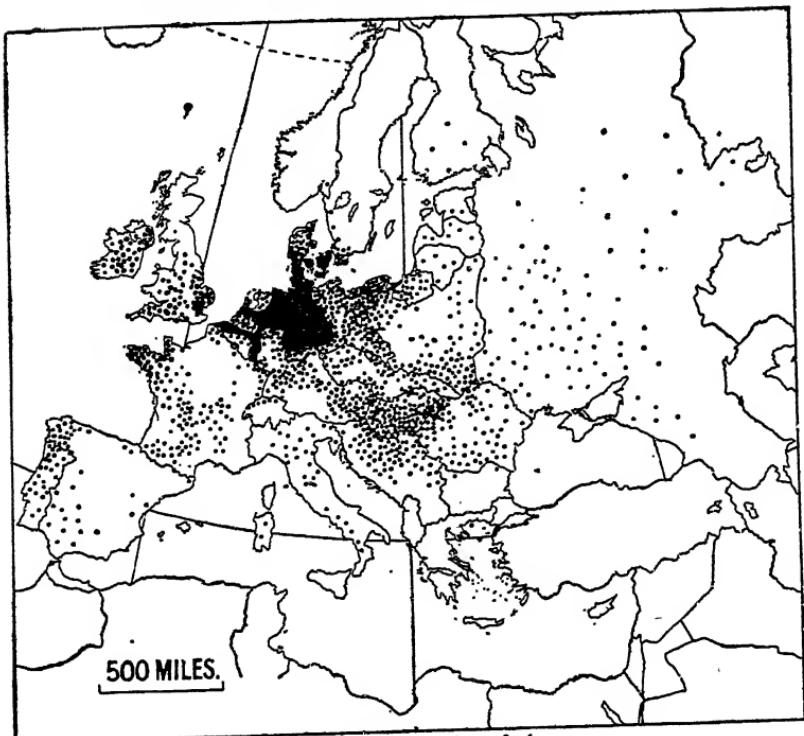


FIG. 39.—The distribution of pigs.

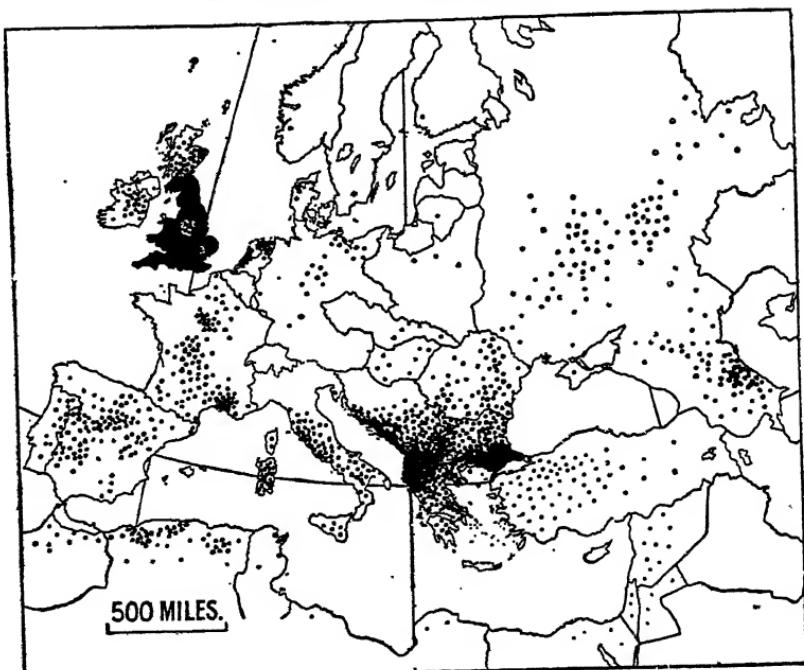


FIG. 40.—The distribution of sheep.

in Denmark, northern Germany, Holland, and Belgium, and depend on the availability of barley, potatoes, and dairy by-products (especially skimmed milk). The goats of Europe are concentrated in the dry hills of the Balkan Peninsula, they are also numerous in the dry lands of North Africa and Asia Minor; but sheep present what seems a curious distribution, being remarkably numerous in the British Isles and the Balkan Peninsula. It is obvious in the case of sheep that economic considerations have completely upset the normal geographical distribution. In Germany and Belgium,

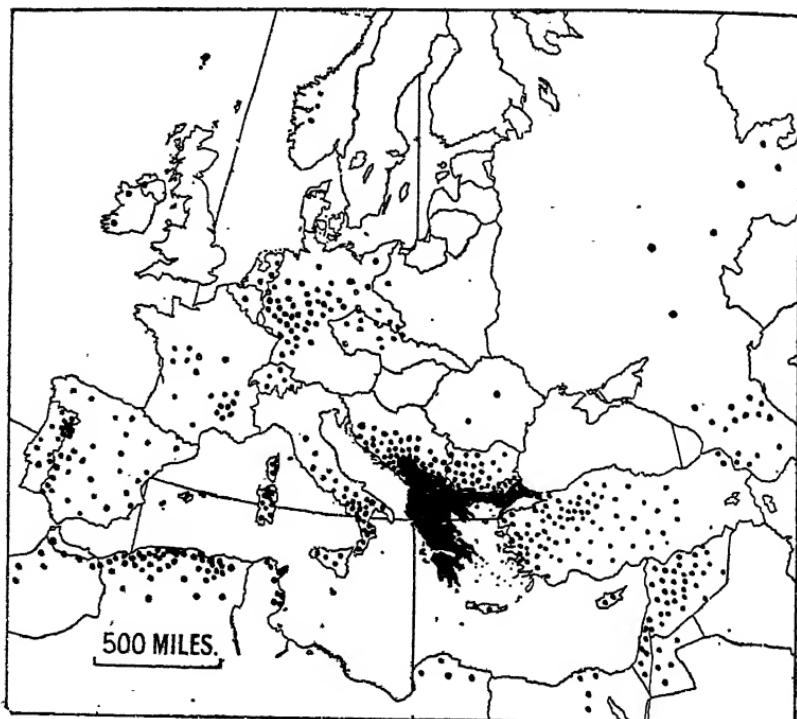


FIG. 41.—The distribution of goats.

for example, the land is needed for other purposes—sheep have been crowded out.

European Fisheries.—Most of the important sea fisheries of the world are found in temperate waters. Fish require broad expanses of shallow sea, suitable for spawning grounds, where the food supply, in the form of plankton or minute animals and plants, is abundant. The great fisheries are therefore restricted to regions where there is a broad continental shelf. There are four regions in the world of paramount importance:

- (1) The North Pacific Coast of Oregon, Washington, British Columbia, and Alaska.

(2) The North Atlantic Coast of Labrador, Newfoundland (including the Great Banks), Canada, and the New England States.

(3) The coasts of north-western Europe, including the North Sea.

(4) The coasts of Japan.

The fishing grounds of north-western Europe extend from Lapland to the coast of Morocco, and include the coasts of Iceland. But the most important area is the North Sea. Inshore fishing rights are reserved, but the main North Sea grounds are shared by British, Norwegian, German, Dutch, and other fishermen. British fisheries in all support nearly a quarter of a million people. In 1934, 1,000,000 tons of fish were landed, valued at over £15,000,000. About 50 per cent. are herring, 15 per cent. cod, and 10 per cent. haddock. Hake are important off the west coasts of Britain, pilchard in the south-west, and plaice in shallower waters. The principal Norwegian fisheries are those of cod and herring, the cod being particularly abundant round the Lofoden Islands. The fisheries of France, Spain, and Portugal are especially for sardines and sprats.

Other important areas include the western Mediterranean (sardines, anchovies, and tunny), and the tidal estuaries such as the mouth of the Thames and Rhine, where oysters flourish.

Of inland fisheries, those of Russian rivers are, perhaps, the most famous, because of the production of caviare (sturgeon roes).

The Peoples of Europe.—Except in the extreme north and in parts of Russia in the south-east, Europe is inhabited entirely by peoples of the white or Indo-European race. There are three main divisions. The people of the north, the Nordics, are pale-skinned, usually with light hair and eyes. The people of the south, the Mediterranean peoples, are darker-skinned, shorter in stature, and have dark hair and eyes. Between these two, in Russia and central Europe, we find the Alpine peoples, with broad, flat faces, and heads which are short when measured from back to front. In the south-east of Europe, on the Steppes and the grasslands of Hungary, there are Mongolian peoples, including the Magyars of Hungary and the Cossacks of Russia. It is characteristic of the essential unity of the Mediterranean basin that the inhabitants of the northern coasts of Africa, the Arabs and Moors, should also be Indo-European peoples. Apart from their racial affinity with the peoples of southern Europe, the Moors in the Middle Ages overran a large part of Spain, and so there one can find the intermingling of Moorish and Mediterranean blood.

It is, of course, a well-known fact that the population of Europe is densest in the great industrial regions. As a result the population is urban rather than rural in many countries, and in some the urban population actually reaches over 80 per cent. of the whole. Most

European countries now have their population problems ; and a number may be regarded as "saturated" with people : that is to say, the countries now contain as many people as they can support, either by agriculture or by industry. Italy is in this position, and every year a large number of Italians emigrate to other continents. Great Britain is also in this position. Pressure of population is behind many of the great European problems of the present day. For example, there is the rivalry between France and Italy, both of which countries have about the same population of 41 to 42 million. Until recently that of Italy was still increasing rapidly, that of France practically stable. France has large overseas possessions of fertile lands which await development, and which afford large fields for settlement for her people should she require them. But she really has no surplus population in France itself to colonize effectively these new lands. Italy, on the other hand, only possesses large tracts of the African desert for her overseas colonies, and these areas do not afford field for settlement. Consequently the surplus Italian population is compelled to settle in foreign countries under other than the Italian flag—countries that include particularly the Argentine. Hence the rather natural resentment by Italy of the comparatively favourable position of her neighbour France.

The Countries of Europe.—The ancient Greeks realized long ago that the earth was a sphere, and they actually calculated the size ; but they also realized that they only knew a small portion of the surface of that sphere, which was to them the known world. The centre of the world to the Greeks and other ancient peoples was the Mediterranean Sea. Their knowledge extended as far as the Atlantic Ocean, and the British Isles lay on the extreme west of the known world. To the south their knowledge was bounded by the vast expanse of the Sahara desert ; to the south-east it extended as far as the Indian Ocean. The majority of the great civilizations of the ancient world arose round the Mediterranean Sea ; and in turn the Mediterranean countries have been centres of vast empires : Greece, Minos (Crete), Rome, Carthage, Spain under the Moors, Spain under the Spaniards, and Portugal ; while the other great civilizations of Egypt, Babylonia, and Assyria are on the fringe of the Mediterranean region. It has been pointed out by some writers that the Mediterranean climate seems to favour a comparatively rapid development not only of individuals, but of nations. Men and women reach maturity at an earlier age than they do in colder climes ; and it has been shown that the nations round the Mediterranean also reached their prime in a shorter time than they would have done had the climate been different in character. It is true that the centres of the great empires and the great civilizations have moved to the countries of northern Europe with their more vigorous climate : Great Britain, France, Holland,

POPULATION IN EUROPE

This table is intended to show certain of the more important facts concerning the population of European countries.

In the first place, by giving the population at the last two censuses it shows the rate of growth of the population (expressed in the fifth column as a percentage). The next columns relate to the last census available and give (a) density per square mile, (b) urban population, (c) rural population, and (d) population dependent upon agriculture—(b), (c) and (d) being expressed as percentages of the total population.

Country	Area Square miles	Population		Increase in decade	At last Census			Agricultural
		1920-21	1930-31		Density	Urban	Rural	
England . . .	50,874	34,045,290	37,769,738	9·8	524	80	20	8
Wales . . .	7,466	2,025,202	2,158,193	6·6	289	80	20	8
Scotland . . .	30,405	4,882,497	4,842,554	-0·01	159	78	22	—
Northern Ireland (1926) . . .	5,235	—	1,256,561	—	240	—	—	—
[Irish Free State	26,600	—	2,971,992	—	112	—	—	55
Norway . . .	124,533	2,649,775	2,809,564	6·0	23	30	70	33
Sweden . . .	173,146	5,904,489	6,141,571	3·9	35	33	67	38
Finland . . .	132,589	3,364,807	3,658,125	8·7	28	18	72	65
Russia, 1926-33	8,241,921	147,013,609	165,768,400	12·8	20	18	72	80
Estonia . . .	18,353	—	1,117,000	—	61	—	—	57
Latvia . . .	24,440	—	1,900,045	—	77	—	—	61
Lithuania . . .	55,670	—	2,367,072	—	43	—	—	68
Poland . . .	139,868	—	31,927,773	—	228	27	73	65
Germany, 1933	181,699	—	66,030,491	5·4	363	—	—	23
Denmark . . .	16,576	—	3,550,656	6·7	214	44	56	31
Holland . . .	12,603	6,865,314	7,920,388	15·4	625	49	51	23
Belgium . . .	11,755	7,465,782	8,092,004	8·89	688	—	—	20
Switzerland . . .	15,940	3,880,320	4,066,400	4·8	255	—	—	26
Austria, 1934 .	32,369	—	6,760,233	—	202	—	—	29
Hungary . . .	35,875	7,989,069	8,683,740	8·8	242	—	—	55
Czechoslovakia	54,226	13,613,172	14,726,158	8·2	272	—	—	39
Yugoslavia . . .	95,558	—	13,930,918	—	146	—	—	—
Rumania . . .	122,282	17,393,149	18,025,037	3·6	147	—	—	—
France . . .	212,659	39,209,518	41,834,923	—	197	49	51	38
Spain . . .	196,607	21,338,381	23,563,867	10·6	122	—	—	—
Portugal . . .	35,490	6,032,991	6,825,883	13·1	192	—	—	—
Italy . . .	119,713	38,769,798	41,220,434	6·3	344	—	—	51
Greece, 1928 . .	50,257	5,531,474	6,204,684	12·2	123	33	67	—
Bulgaria, 1934 .	39,825	4,846,971	6,090,215	—	138	21	79	75

In this map, which is very much generalized, the four tints used correspond roughly with the following types of area :—

- (a) The black areas are in the main industrial areas. It is only in a very few of the most fertile agricultural tracts that the population approaches 256 to the square mile. Although in China agricultural populations—with a very low standard of living combined with intensive agriculture and a constant danger of famine—may reach even 2,000

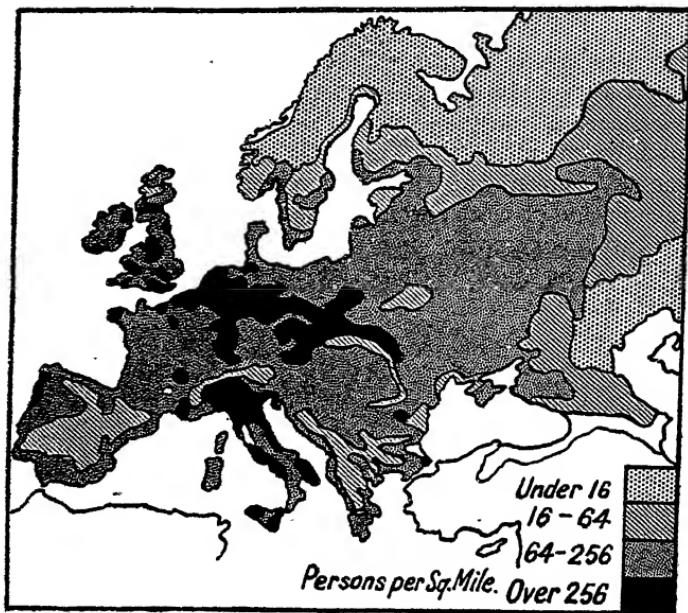


FIG. 41A.—The Population of Europe.

and 3,00 per square mile, an in India may reach 6,000 or 7,000, it is generally agreed that one of the most prolific of grains—rice—cannot support a population of more than 200 or 250 to the square mile. Thus

while the black parts of this map cover some of the rich agricultural area such as the northern plain of Italy, these tracts include also some industrial towns.

- (b) The heavily dotted areas (with a population of 64 to 256 persons per square mile) correspond broadly with the chief agricultural areas. It will be noted that the northern limit coincides roughly with the northern limit of the deciduous forest belt; in the coniferous forest belt comparatively little agriculture is possible. It may be noted that even the richest agricultural areas such as the Black Earth belt of Russia and the Paris Basin do not support a population as dense as 256 to the square mile.
- (c) The lined areas (with a population of 16 to 64 persons per square mile) correspond broadly with the tract where physical conditions limit agriculture. Some of the factors are aridity (e.g. in Spain and south-eastern Russia), elevation (in the Alps and Carpathians), aridity and elevation (in the Balkan mountains), cold (in the northern belt). The factor of excessive rainfall operates in the western British Isles (as shown in detail in Fig. 70) and in western Norway.
- (d) The lightly dotted areas correspond with the regions where cold (in the north) or aridity (in the south-east) make close settlement almost impossible.

Belgium, and Germany. It may be, however, that the discovery of America has played a very large part in this change. Instead of the Mediterranean the Atlantic becomes the centre of the world, and those countries of north-western Europe which face the New World are the countries now most favourably situated. The Mediterranean became a backwater. This phase may be said to have lasted from 1492 to 1869, when the Suez Canal was opened. It is certainly true that this canal has done a great deal towards resuscitating the Mediterranean as a highway. The great ports of Barcelona, Marseilles, Genoa, Venice, Trieste, and others are witnesses of this change.

In studying the countries of Europe it is very important to notice the relations in which they stand to the great natural regions. They may be grouped as follows :

Countries of the Mediterranean.—Spain and Portugal, Italy, Albania, and Greece are the European Mediterranean countries ; to these should be added Turkey, Syria, and Palestine in Asia; Morocco, Algeria, and Tunisia in North Africa. Yet not one of the countries surrounding the Mediterranean Sea is wholly Mediterranean. Along their northern borders Portugal and Spain enjoy areas with the North-west European type of climate ; Italy and Greece have regions with a Central European type of climate ; whilst the others have considerable desert areas. This is important, because it means that the European Mediterranean countries also share in the products characteristic of the cooler, north European type of climate.

Countries of Central Europe and the Danube Basin.—Here Switzerland and Austria share the mountainous flanks of the Alps and the neighbouring mountains. Hungary lies in the heart of the Hungarian Plain, but does not include the full geographical extent of that plain. Fragments of the Hungarian Plain lie in Czechoslovakia, Yugoslavia, and Rumania, which otherwise include most of the remainder of the mountain belt of Central Europe. Bulgaria is mainly a hilly country, with a Central European type of climate, but Rumania enjoys a portion of the Steppeland region from its neighbour Russia.

Countries of the Great European Plain.—France, Belgium, Holland, Denmark, Germany, Poland, and the Baltic States are the countries which occupy the Great European Plain ; but of these it should be noted that France has an important tract of Mediterranean country, Germany a considerable part of the hill country of Central Europe, and only the smaller ones are essentially countries of the plain. Perhaps in this group we should include the British Isles ; and it is interesting to notice that they lie wholly within one climatic region—that of north-western Europe.

The Countries of Fennoscandia.—The three countries of Fennoscandia are Norway, Sweden, and Finland, sharing the ancient block

which makes up the northern part of Europe and which is actually continued in the Highlands of Scotland. From the climatic point of view, Fennoscandia lies mainly in the Cold Temperate, Coniferous Forest Belt, but southern Sweden should properly be grouped with the plainlands of northern Europe, and has a Central European



FIG. 42.—The countries of Europe, showing by dots the position of their capitals. The excentricity of some of the capitals should be noted.

type of climate. The coastlands of Norway, exposed as they are to the ameliorating influences of the North Atlantic Drift, enjoy the North-west European climate and its inherent advantages. Finland, the northernmost independent country of the world, lies almost wholly within the Cold Temperate regions.

Eastern Europe.—Eastern Europe is synonymous approximately

ith Russia, and it is noteworthy that Russia includes in her vast extent in Europe representatives of the principal climatic regions, if one excepts North-western Europe. From the Tundra on the north, through the Cold Temperate, the Central European type, to the Steppeland type, and even including, on the southern fringe of the Crimea, a tiny strip which may be called Mediterranean.

Out of the twenty-six countries, six are empires with foreign possessions (Britain, Norway, Belgium, Holland, Italy, and Den-

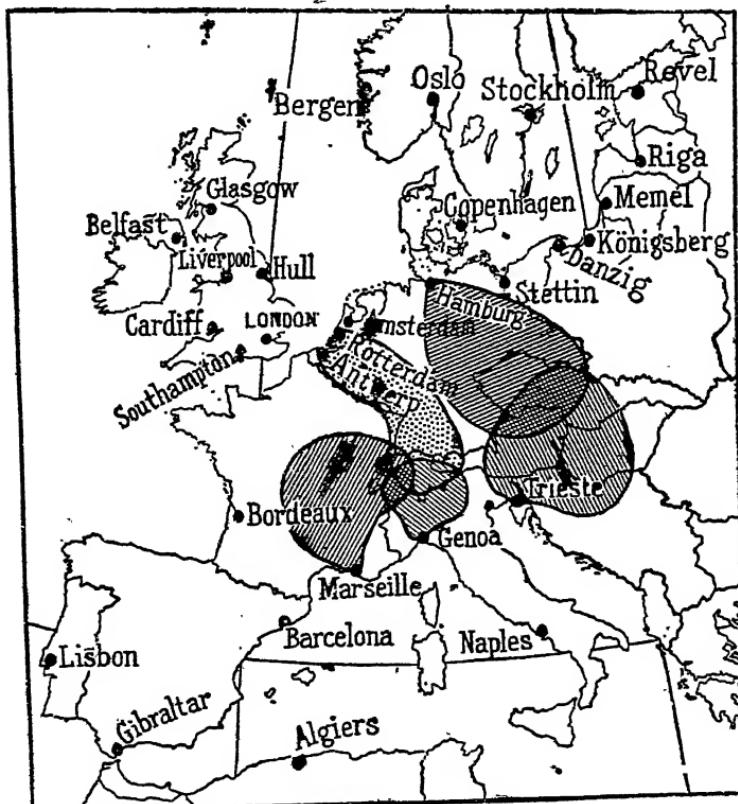


FIG. 43.—The chief ports of Europe.

An attempt has been made to show the approximate hinterlands of Trieste, Genoa, Marseille, Rotterdam-Antwerp, and Hamburg, in order to illustrate the overlapping of hinterlands in central Europe.

mark), seven are kingdoms without foreign possessions (Sweden, Hungary, Yugoslavia, Albania, Greece, Rumania, and Bulgaria), four are republics with foreign possessions (France, Portugal, Spain, and Russia). The remaining nine are republics without foreign possessions (Switzerland, Czechoslovakia, Poland, Latvia, Lithuania, Estonia, Finland, Germany, and Turkey).

European Communications.—With the exception of the heart of Russia no part of Europe is more than 500 miles from the sea, with the result that between individual countries transport by sea plays a very important part. It is, for example, cheaper to send bulky commodities, such as coal and timber, by water, *via* the Straits of Gibraltar, from Poland to Italy, than across central Europe by rail. Further, the intricate coast of Europe is well furnished with harbours. Only the Baltic and White Seas are partly blocked by ice in the winter, and even a country such as

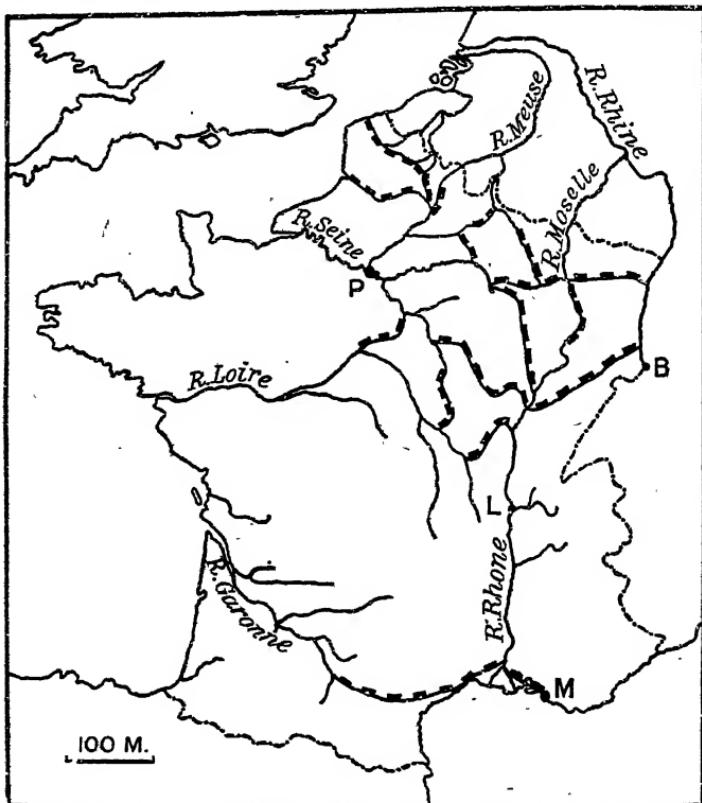
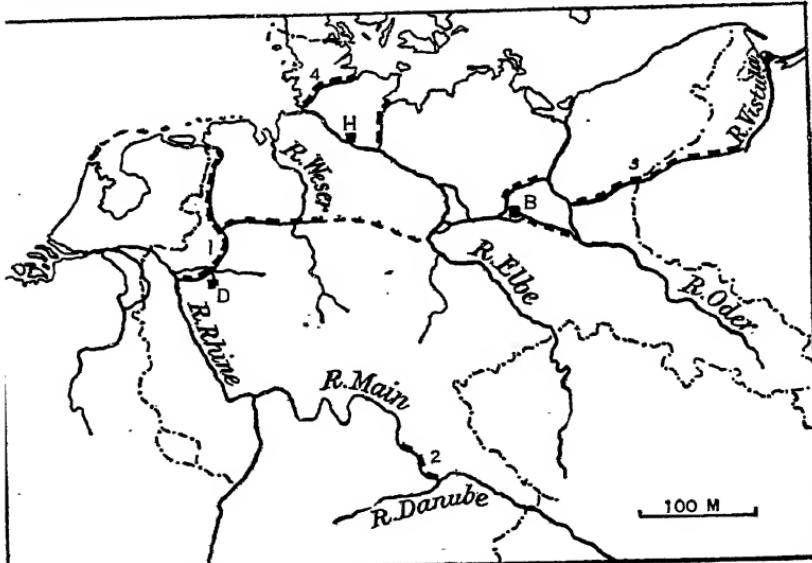


FIG. 44.—The principal inland waterways of France.

Finland at the head of the Baltic has at least one port (Hango) open the whole year. The same is true of Latvia, where when Riga is closed by ice, Ventspils remains open. When the Baltic approach to Russia *via* Leningrad is closed, Russia has throughout the year a port *via* the Black Sea. It follows that both the inland water and railway communications of European countries tend to be concentrated on the larger ports. Trans-continental routes are less important. In the study of trans-continental routes, however, two matters stand out as of a special importance. One is the linking up of waterways throughout the whole of the North

uropean Plain, and with the southward flowing river systems of the Rhone and Danube. The other is the construction of railway routes to connect northern and southern Europe across the central mountain belt, and hence the special significance of the great Alpine tunnels and of certain towns, notably Vienna, which occupy key positions relative to such lines of communication.

Inland waterways are particularly important in France, Belgium, Holland, and Germany. Fig. 44 shows the way in which the principal rivers of France have all been connected by canals so that there is continuous communication by waterways from the Mediterranean to the Atlantic Ocean, to the English Channel, and



flow, in general, from south-east to north-west. The great aim of canal construction in Germany has been the construction of east to west links. How far this has actually been done can be seen from the diagram.

Outside of France and Germany, the river Danube forms the most important waterway of Europe. It is navigable for 1,500 miles from Ulm downwards, and below Turnu Severin by sea-going vessels. Below Budapest, however, the banks are marshy and afford few sites for towns ; for two months in winter fixed or floating ice is a serious obstruction, and the river flows *away from* the populous centres of Europe. Even in the pre-war, prosperous days

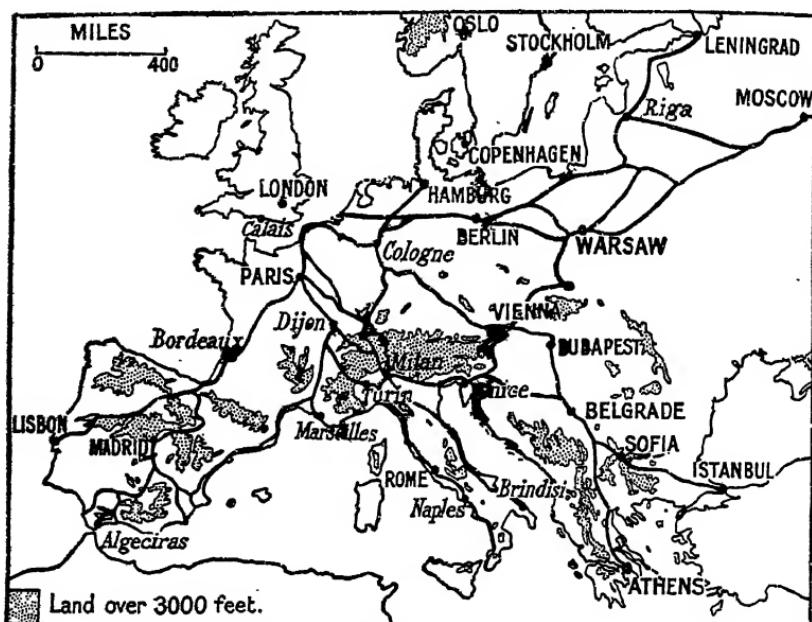


FIG. 46.—Trans-European railways.

of Vienna the total tonnage there was less than a tenth of that of the Seine at Paris. Although the Danube is joined by a canal with the Main, and thus with the Rhine (Ludwig's Canal), there is comparatively little traffic by this route.

Certain isolated but important canals in Europe should be noted, especially the Kiel Canal, facilitating the passage of steamers from the North Sea to the Baltic Sea. The canal across the Isthmus of Corinth in Greece, on the other hand, has not been quite so successful. The important waterways, by canal and lake, from the North Sea to Stockholm, and the Russian (p. 197A), should be noted.

The railways of Europe are, very fortunately, nearly all on the standard gauge (4 feet 8½ inches), which is in use in Great Britain.

The principal exceptions to this general statement are Spain and Portugal, where a broader gauge is used, and Russia, including the neighbouring Republic of Finland, where again a broader gauge is in use. It follows that trans-continental expresses run across Europe from Calais or Paris to Istanbul (the Orient and Simplon-Orient express routes), and in other directions from Riga and the Polish-Russian frontier to Berlin, Paris, and the Spanish frontier. The adoption of the standard gauge has greatly facilitated not only the actual linking up of national systems, but the joining of the isolated systems by means of train ferries. Train ferries, by which

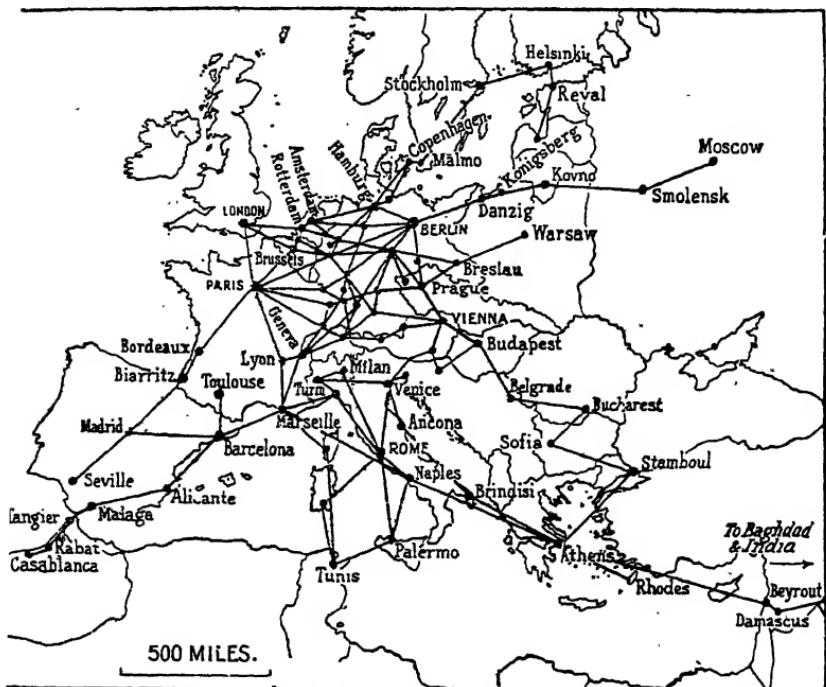


FIG. 47.—Principal air routes of Europe in operation December 1930.
The network has now greatly increased.

The Imperial Airways route *via* Brindisi to Cairo (for the Cape Town and Indian Australian services) should be added.

the traveller journeys from his starting-point to his destination without getting out of his carriage, are in operation between Germany, the islands of Denmark (including Copenhagen) and Sweden. In 1936 a train ferry service, *via* Dover and Dunkerque, was initiated between London and Paris. It is interesting to notice the exact way in which the mountain chains of Europe have acted as barriers to railway construction. Until a few years ago no railway crossed the Pyrenees. The links between France and Spain were along the sea coast at the eastern or western ends of the mountain chain. The Alps were only gradually conquered by a series of stupendous

tunnels—the Simplon, Mont Cenis, and St. Gotthard. For hundreds of miles no railway crosses the Carpathians, whilst in Italy the Apennines have proved a serious obstacle. Some of these matters will be dealt with in greater detail under the countries concerned.

In the last few years aerial transport, mainly for mails and passengers, has assumed a very considerable importance in Europe, where there is naturally an enormous amount of business carried on, particularly between the capitals of the various countries concerned. It is difficult to present a map of the aerial routes in operation in Europe, because of the rather rapid changes which are taking place, but an attempt has been made to show in Fig. 47 regular commercial routes in operation at the close of 1930. The network has since been greatly increased. The following table shows some of the times taken by air compared with the other fastest means of transport from London.

By Imperial Airways :—

	Air	Other Ways
To Egypt	1 day	$4\frac{1}{2}$ days
„ Palestine	$1\frac{1}{2}$ days	$4\frac{3}{4}$ „
„ India (Bombay)	3 "	$13\frac{1}{2}$ "
„ Australia (Sydney)	8 "	31 "

By Various Services :—

To Paris	$2\frac{1}{2}$ hours	$6\frac{3}{4}$ hours
„ Brussels	2 "	$6\frac{1}{4}$ „
„ Berlin	5 "	19 "
„ Moscow	17 "	$2\frac{1}{2}$ days

In 1937 Imperial Airways began a direct flying boat service from Southampton, thus decreasing considerably the time required to reach Egypt and the Far East. In 1938 the service was extended to Australia—now reached in 7 days from London.

SECTION II

THE BRITISH ISLES

Position and Size.—The British Isles comprise the two large lands of Great Britain and Ireland, together with a number of smaller islands, lying off the north-west coast of the continent of Europe. The English Channel, narrowing eastwards to the Strait of Dover, which is only twenty-one miles wide at the narrowest



FIG. 48.—Map of the British Isles showing the shallow continental shelf.

Those parts of the sea unshaded are less than 100 fathoms (600 feet) in depth.

part, separates the south of England from France; the North Sea lies between Britain and Holland, Germany, Denmark, and Norway.

The island of Great Britain consists of the three countries, Scotland in the north, Wales in a part of the west, and England occupying the remainder. England, Scotland, and Wales have been joined under one king since 1603. Since 1920 Ireland has been divided into "Northern Ireland" and the "Irish Free State."

Northern Ireland has a parliament of its own, but is otherwise closely united with Great Britain; but the Irish Free State is an independent dominion of the British Empire, having a president of its own. "United Kingdom" used to mean the United Kingdom of Great Britain and Ireland; now it means the United Kingdom of Great Britain and Northern Ireland. The distinction is important when comparing pre-war and post-war statistics, and care must always be taken when studying figures in official publications to see whether they apply to England and Wales only, or to Great Britain or to the United Kingdom. It should be noted that the Channel Isles and the Isle of Man enjoy certain privileges in matters of government, and are sometimes included, sometimes excluded, in statistical compilations. The following table is given for reference purposes:

	Area (sq. miles)	Population 1921	Population 1931
England	50,874	35,681,019	37,789,738
Wales	7,466	2,205,680	2,158,193
Scotland	30,405	4,882,497	4,842,554
Isle of Man	221	60,284	49,338
Channel Islands . . .	75	90,230	93,061
Northern Ireland . . .	5,235	1,256,561 ¹	1,246,000
Irish Free State . . .	26,600	2,971,992 ¹	2,965,854 ²

¹ 1926. ² 1936.

The British Isles lie mainly within the quadrilateral formed by the two lines of longitude 0° and 10° West, and the two lines of latitude 50° and 60° North. It has already been pointed out that although the ancient Greeks realized that the earth was a sphere,



FIG. 49.—Terminal position of Britain in the known world of the Greeks and the mediæval geographers. (From Ptolemy.)

the known world to them was an area centring around the Mediterranean Sea, so that the British Isles lay on the fringe of the area. Indeed, right into the Middle Ages Britain occupied this position. The most accessible part of the country was that facing the continent of Europe, a fact which is reflected in the use of the name Albion for the whole of Britain, based merely on the white chalk

cliffs of the south-east. Ireland and the northern parts of Scotland remained almost unknown countries. The rediscovery of America by Columbus, in 1492, and the rapid growth to importance of the lands on the western side of the Atlantic revolutionized the importance of Britain's geographical position. Instead of occupying

terminal position on the fringe of the known world, Britain now occupied a central position on the eastern shores of the Atlantic Ocean, which from that time onward replaced the Mediterranean as the heart of the world's life and commerce.

It is a well-known fact that Britain lies in the centre of the land hemisphere, but what is always realized is the remarkable way in which Britain stands as a door-keeper for the globe, or nearly the whole, of Europe. If one takes a globe and attempts to mark out on the shortest routes between the capitals of all the northern and central European states on the one hand, and New York or the busy industrial cities of the New World on the other, one finds that these shortest routes pass across the British Isles. Hence German and Dutch steamship lines tend automatically to call at British ports on their way westwards. At present the western termini of the



FIG. 50.—The world position of the British Isles—London the centre of the land hemisphere. Note, however, the obstacle formed by the Polar ice-regions.

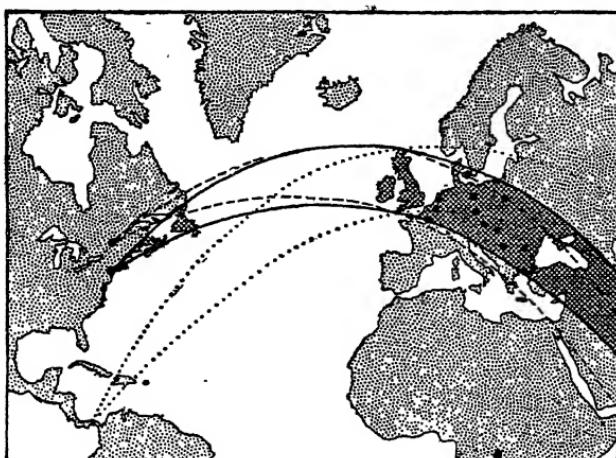


FIG. 51.—Routes from Europe to North America.

Within the two dark lines are the shortest routes between New York and the capitals of Europe marked by dots; in each case the shortest route passes through the British Isles.

A continental railway system may be regarded as at Calais or Ostend or Cherbourg, but if in the future the Channel tunnel should become an established fact, Liverpool and Southampton or Plymouth would automatically assume that function, at any rate as far as passenger

traffic were concerned. This has been partially realised through the Dover to Dunkerque train ferry service, initiated 1936.

Nor is the importance of the geographical position of the British Isles likely to be minimized in the future with the development of aerial transport. True, there is the southern route across the Atlantic *via* the Azores and the West Indies, but shorter stages are afforded by the northern route by Scotland, Iceland, Greenland, and Labrador.

Apart from the advantages of this world position of the British Isles, there are numerous advantages more local in character. The existence of a broad continental shelf on which the warm waters drifting across the north Atlantic are piled up, ensures not only the maximum benefit from these waters in the amelioration of the climate, but affords also vast feeding grounds for fish; so that Britain is surrounded by the richest fishing grounds in the world. Her ports, always free from ice, are kept clear from silt by the strong tidal scour, which is also largely the result of the existence of the continental shelf. These ports face the most important and the most developed parts of America on the one hand, and the *embouchure* of the most important river of Europe on the other. Indeed, there is no doubt that the geographical position of Britain in the modern world is an important factor in her prosperity, and is symbolical of the intermediary position which she occupies in affairs political, financial, and commercial between the countries of Europe on the one hand and the New World on the other.

Physical Features.—The advantages accruing to the British Isles by virtue of their world position have been greatly enhanced by the structure of the islands themselves. The seas surrounding the islands are shallow, and, as mentioned above, the extensive continental shelf affords breeding and feeding grounds for the fish which from the earliest times have attracted Britons to the sea. The British Isles have a very long coastline, for the coasts are so deeply indented that no part of the islands is as much as one hundred miles from the sea. The tide-scoured inlets afford excellent harbours and, further, there are no high mountains to hinder communications with the interior. Though many parts of the islands are hilly, and even mountainous, the greatest elevation reached in England and Wales is under 4,000 feet, whilst the highest peak in Scotland, Ben Nevis, attains but 4,400 feet.

The British Isles are divisible into a number of fairly well-defined physical units, as shown in Fig. 52. Scotland falls into four divisions:

The Highlands form a great dissected plateau occupying the northern half of Scotland, divided into two by the deep trench of Glen More, which separates the North-West Highlands from the Grampians. The scenery of the plateau has been moulded to a

e extent by ice action during the Great Ice Age. The west it is a typical fiorded coast with wild, rocky scenery. The fiords Scotland, like those of Norway, are deep, steep-sided inlets of the often marked by sharp, almost right-angled bends, and by a merged ridge near the mouth. They are generally believed to have been excavated by tongues of ice working along lines of weakness caused by two sets of great cracks at right angles.



FIG. 52.—The natural regions of the British Isles.

(NOTE : The regions of Ireland are more accurately shown on p. 161.)

North-East Scotland is the more fertile land along the east coast of the Highlands.

The Southern Uplands are formed by a broad, low fold range running with a north-east to south-west trend (Caledonian trend) across the south.

The Midland Valley, the most important part of Scotland, lies between the Highlands and the Southern Uplands.

England and Wales may, in the first instance, be divided very simply as shown in Fig. 52.

If a line is drawn across England and Wales from south-west to north-east, it is found that the old rocks and the mountainous regions lie to the north-west, whilst to the south-east are mostly young rocks and lowlands. To the north-west there are three main areas of mountains :

The Lake District of the north (Cumbrian Mountains).

Wales, consisting of very old rocks in the north (Cambrian Mountains), but with a great coal basin in the south (South Wales Coalfield).

Devon and Cornwall, or *Cornubia*, occupying the peninsula of the south-west.

Then running down the centre of the north of England is its backbone, the *Pennine Range*. Part of the great *Midland Plain* wraps round the southern end of the Pennine Upland and separates it from the other hill masses.

The *south-east of England* consists of low ridges running from south-west to north-east, marking the outcrops of successive beds of rock. In the extreme south-east is an arch, or anticline, running from east to west (the Weald), whilst London lies in the syncline (London Basin).

Ireland is shaped like a saucer, a central lowland surrounded by a broken and irregular rim of mountains. The mountains in the north (Donegal Mountains) once joined the Highlands of Scotland ; the mountains of the south-east (Wicklow Mountains) were once part of the Welsh mass.

Rivers.—The rivers of the British Isles are short, and since the mountains are usually on the western sides of the islands, most of the longest ones flow eastwards. The rivers are not, as a rule, swift enough to supply hydro-electric power (though some of the Scotch streams are sufficiently swift, and in Ireland the river Shannon has been harnessed in recent years); they are too shallow to be used by river steamers, but they are very important commercially, because their mouths are often navigable by the largest ocean-going vessels and afford excellent harbours. They are rarely subject to floods, but have a gentle flow of water, and tides help to keep the mouths clear all the year round. They are rarely, if ever, frozen. Look carefully at the map, and note the position of these rivers, with the ports which lie near their mouths : Don, Dee, Tay, Forth (east of Scotland), Tyne, Tees, Humber, Thames (east coast of England), Clyde (west of Scotland), Mersey, and Severn (west of England). The only large river in Ireland is the Shannon. The fact that the majority of English and Scottish rivers flow eastwards is a fortunate circumstance, from the economic point of view, since their mouths face the great river outlets of the Continent. Though not mountainous, practically the whole surface of England is hilly, and the relative unimportance of water transport, despite

extensive canal system, when compared with France and Germany, is due mainly to the large number of locks necessary on the S.

British Minerals.—The following table is included for



FIG. 53.—Rivers and hydro-electric power.

The heavy line shows the main water parting; five of the larger basins are separately indicated. The black triangles are points where water power has been developed

rence purposes to show the relative importance of the principal
industrial products of Great Britain. The figures given are the average
for the years 1931-33 (approximately the same, 1931-37).

Mineral	Quantity, in tons	Value, in £ sterling
Coal	211,768,000	140,257,000
Iron ore	7,472,000	1,682,000
Limestone	13,104,000	2,877,000
Igneous rock	10,000,000	3,206,000
Slate	256,000	1,498,000
Sandstone	3,645,000	1,574,000
Salt	2,151,000	1,042,000
Clay, shale, etc.	16,495,000	1,495,000
China clay	741,000	802,000
Fireclay	1,651,000	569,000
Gravel and sand	10,341,000	1,572,000
Oil shale	1,500,000	415,000
Tin ore	2,000	163,000
Chalk	6,200,000	430,000
Gypsum	662,000	456,000
All others	—	864,000
Total	—	158,902,000

It will be seen that coal represents 88 per cent. by value of all the mineral products of the British Isles, and the next mineral in order of importance, iron ore, only represents about 1·7 per cent. of the total value. All the other minerals of which the annual value is over £1,000,000 are non-metallic. Of the metallic minerals for which Britain was once famous, tin ore and lead ore are the only ones of any considerable value. In normal years the mining industries of Great Britain give employment to over a million people.

COAL.—Some reference has already been made to the distribution of British coalfields, and the following table is intended to show the relative importance of the fields. (Figures in millions of tons.)

Field	Yearly average		
	1909-13	1922-4	1931-5
Ayrshire ¹	—	4·5	3·9
Lanarkshire	—	19·4	13·6
Midlothian ²	—	4·4	4·7
Fifeshire	—	8·5	7·8
Northumberland	14·0	13·7	13·0
Durham	40·4	36·6	29·3
Cumberland	—	2·2	1·5
Yorkshire	39·0	44·7	39·3
Notts and Derby	—	30·2	26·6
North Staffordshire	—	6·3	5·9
South Staffordshire ³	—	7·2	6·2
Leicestershire	—	3·1	2·4
Warwickshire	—	5·1	5·0
Lancashire	27·3	{ 19·2	13·7
North Wales	—	3·2	2·8
South Wales	51·2	52·3	35·3
Forest of Dean	—	1·3	1·2
Bristol and Somerset	—	1·3	0·9
East Kent	—	0·4	1·9

¹ Ayrshire, Dumfries, and Argyll.
² S. Staffs. and Worcestershire.

³ Midlothian and E. Lothian.

It is almost impossible to get a map of Britain showing the position of the coalfields. The ordinary geological map merely shows the position of the exposed coal measures. Frequently the most important parts of the fields are where the coal measures themselves are hidden beneath a blanket of younger rock.

The Scottish Coalfields.—These fields will be considered later in the account of the Midland Valley of Scotland, in which they lie. The coalfields of Scotland are the remains of vegetation which once flourished in the marshy forests of the shallow waters fringing

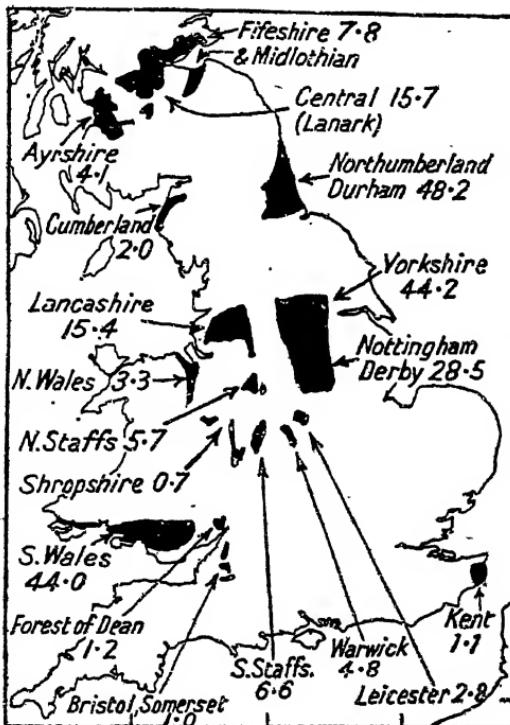


FIG. 54.—The coalfields of Britain.

The figures show number of millions of tons of coal produced annually (average in 1927-31, which is larger than 1931-35).

the great Scottish-Scandinavian continent; and the coal forests here are rather older than in most areas in Britain. In Scotland it is the Lanarkshire field in particular that has given rise to a great manufacturing area, of which Glasgow is the metropolis and outlet. The Fifeshire and Midlothian fields are probably continuous under the waters of the Firth of Forth.

Northumberland and Durham.—The coal measures in Northumberland and Durham dip away from the Pennine Ridge and eventually pass under the waters of the North Sea. The older, shallower workings are thus along the flanks of the Pennines, in

the west of the field. The larger and deeper modern collieries are nearly all to the east, and in many cases the coal is worked by boring through a great thickness of overlying rock. Along the Northumberland coast the coal is worked for a considerable distance under the sea, and two maps are here included to show the way in which the principal coal mines in this district have shifted eastwards in the last twenty-five years. The Northumberland and Durham

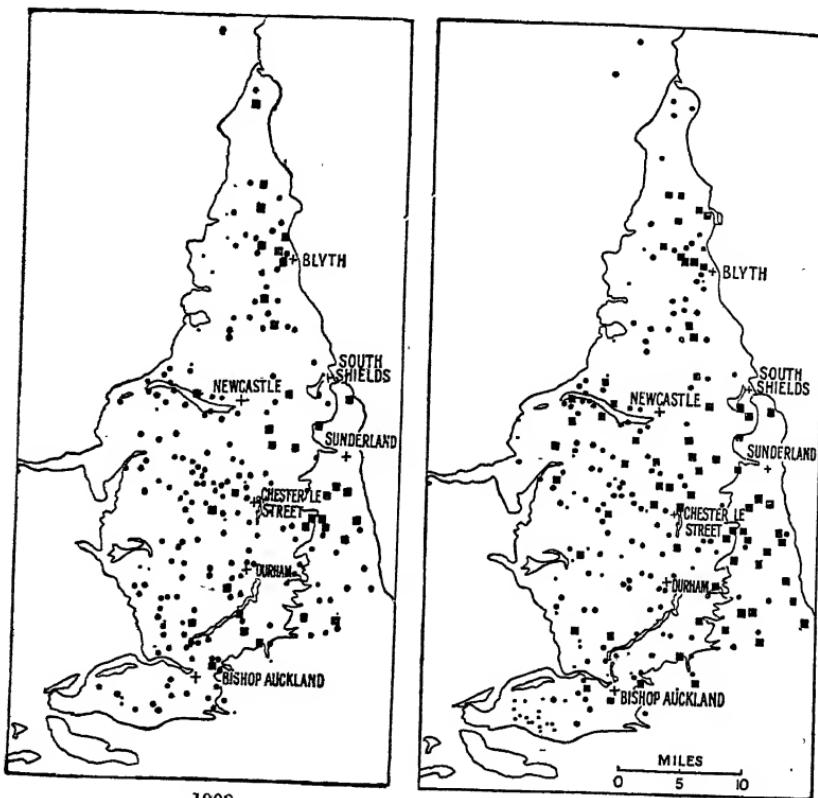


FIG. 55.—The Northumberland-Durham coalfield.

In all these coalfield maps, Figs. 55 to 58 and Fig. 96, the square dots represent collieries employing more than 1,000 men; the large dots collieries employing between 100 and 1,000; the small dots collieries employing less than 100. In the 1931 map count the number of large collieries in the hidden field (to the east). The thin black line shows the limits of the exposed coalfield.

field is more conveniently situated for export of coal by sea than any other large English field; hence it is not surprising to find that in normal years 35 per cent. of all the coal mined is exported, whilst a considerable additional proportion is taken to other parts of Britain by water: for example, to London. Along the coast at such ports as Blyth are the erections known as "staithes": the coal wagons are run straight on to these, and the coal is pitched into the holds of the coal steamers. For various reasons the coal

export trade of Britain has suffered severely since the war, and the effect of this has been specially felt in the Northumberland and Durham coalfield.

Cumberland.—Though only a small field, the Cumberland field resembles that on the other side of the Pennines in the way in which the coal measures run under the sea, but this time westwards under the waters of the Irish Sea. The larger collieries are all situated

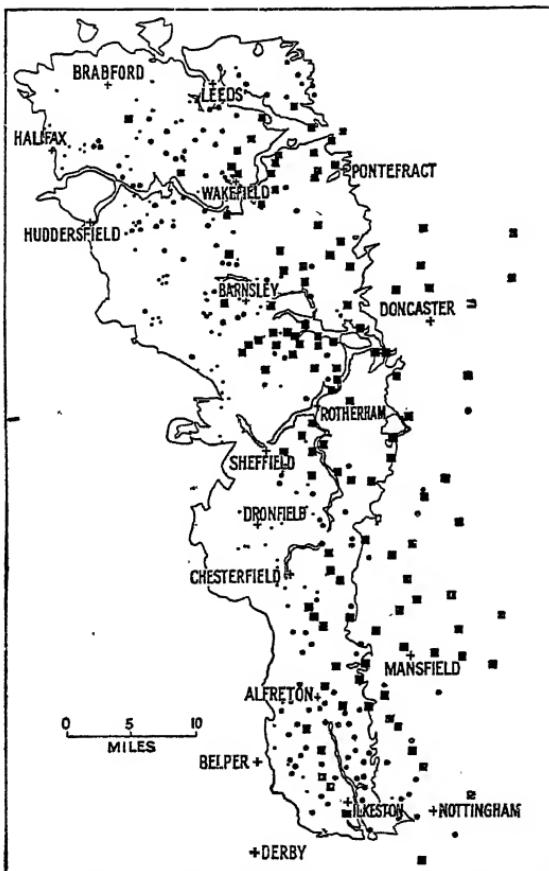


FIG. 56.—The Yorkshire-Nottingham-Derby coalfield (1931).
For explanation of signs, see Fig. 55. Notice the number of large (and modern) collieries in the hidden field, especially round Doncaster.

on or near the coast, and the workings extend for a considerable distance under the sea. It is obvious that a limit must be placed on the distance seawards that the coal can be worked, since naturally it is expensive to haul the coal from the working face to the shaft, which of necessity must remain on land.

Yorkshire, Nottingham, and Derby.—Although one may distinguish the three fields according to the main centres—the West

Riding of Yorkshire corresponding to the great woollen manufacturing districts, the Sheffield area in Yorkshire corresponding to the iron regions, and the Nottinghamshire-Derbyshire or southern end of the field—the whole is geologically continuous, and constitutes the largest coalfield in the British Isles. The coal measures dip to the east and there pass deep under younger rocks, and the exact limit of the field is not known; but there is a marked tendency for the newer and larger workings to lie on the hidden coalfield to the east of the exposed coal measure, and here there have been great developments in new mines within the last few

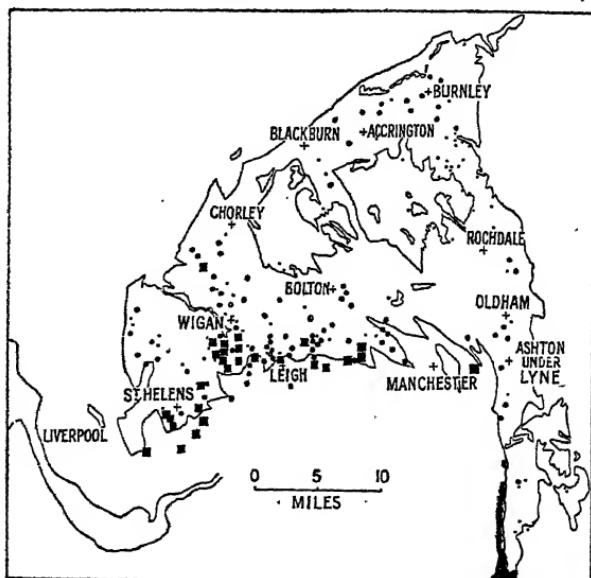


FIG. 57.—The Lancashire coalfield (1931).
For explanation, see Fig. 55. Notice the concentration of the workings around Wigan.

years, notably around Doncaster. The production of this field is mainly for home use.

Lancashire.—Although the Lancashire coalfield occupies a considerable area, the workings are mainly concentrated along the southern margin, especially around the town of Wigan, which is thus the coalfield centre. Again a large proportion of the coal is used at home, in the cotton manufacturing areas.

North Staffordshire is the potteries coalfield; *South Staffordshire* has good quality coal for domestic use, which occurs particularly in the northern end, in the region known as Cannock Chase. The manufacturing centres of the Midlands, such as Birmingham and Coventry, are near rather than on the coalfields, whilst the coalfield of *Leicestershire* is the one considerable unindustrialized field in this country, with the exception, perhaps, of East Kent.

The South Wales coalfield is second in order of size after York-

shire and Notts. It differs from most of the British coalfields in being a true basin, shaped rather like a pie-dish with a bulge upwards in the centre, which brings the coal measures near the surface, so that working is possible all over the basin. The valleys which cut deeply into the surface of the country afford an easy means of access, and the coal is easily shipped downhill *via* these valleys to

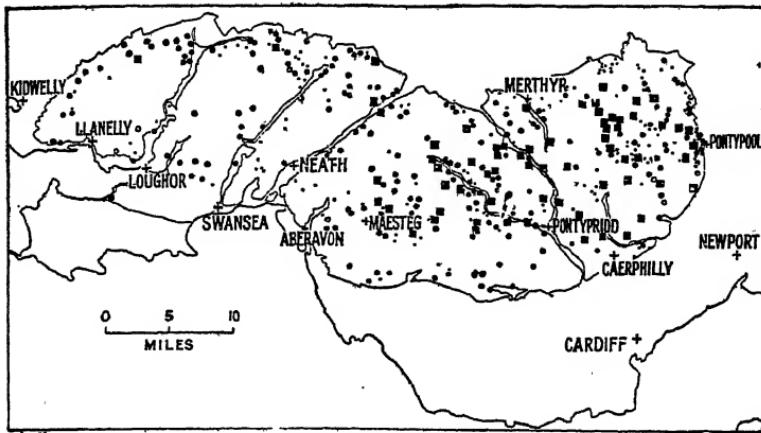


FIG. 58.—The South Wales coalfield (1931).

For explanation, see Fig. 55.

the coast. So that South Wales, after Northumberland and Durham, is the great coal-exporting field. The coal, especially the famous steam coal of Cardiff, is particularly suitable for bunker purposes, while the western end of the field is famous as being the source of Britain's anthracite.

The Forest of Dean coalfield is a small basin, resembling the South Wales coalfield in miniature. *The East Kent* coalfield is interesting

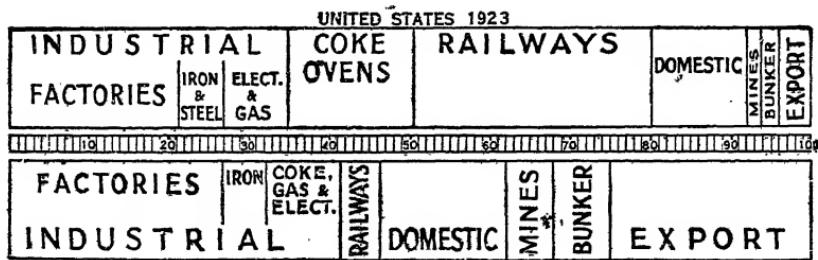


FIG. 59.—The uses to which the coal of the United Kingdom is placed, compared with the United States.

as being an entirely hidden coalfield. Its existence somewhere in the south-east of England was predicted by geologists many years ago, but it was discovered accidentally at the end of last century.

Great Britain produces something like one-sixth of all the coal mined in the world, and the diagram given above shows the uses to

which British coal is placed. This diagram shows that roughly one-third of all the coal mined is exported or supplied to ships as bunker coal. During the war, when it was difficult for Britain to export coal, many foreign countries developed their own resources, or, if they had no coal, developed water-power; and all over the world Britain found her markets much restricted when the war came to an end. So important is this aspect of the British coal trade that for reference purposes a table has been included showing the countries to which Britain exports coal, and the relative quantities both before and after the war.

EXPORT OF COAL FRGM BRITAIN IN MILLIONS OF TONS

	1913	1927-29 (yearly average)	1930	1
Russia	6.0	0.0	0.0	0.0
Finland		0.5	0.4	1.1
Sweden	4.6	2.0	1.8	2.7
Norway	2.3	1.4	1.2	1.3
Denmark	3.0	2.0	1.9	3.3
Germany	9.0	5.0	4.9	3.0
Netherlands	2.0	2.6	2.9	1.3
Belgium	2.0	3.0	3.4	0.5
France	12.8	10.4	13.0	7.1
Portugal and Azores	1.4	1.0	1.2	1.0
Spain and Canary Islands	3.6	2.5	2.1	0.7
Italy	9.6	6.8	7.2	0.1
Austria-Hungary	1.1	—	—	—
Greece	0.7	0.6	0.5	0.1
Rumania	0.3	—	—	—
Turkey	0.4	—	—	—
Algeria	1.3	1.6	1.4	0.9
Portuguese West Africa	0.2	0.3	0.2	0.0
Chile	0.6	—	—	—
Brazil	1.9	1.6	1.2	0.6
United States	—	0.3	0.4	0.1
Uruguay	0.7	0.4	0.3	0.3
Argentina	3.7	2.8	2.7	2.0
Irish Free State	—	2.4	2.5	2.5
Gibraltar	0.4	0.4	0.2	0.4
Malta	0.7	0.2	0.1	0.1
Egypt	3.2	2.2	1.8	1.3
Aden	0.2	0.1	0.0	0.0
India	0.2	0.0	0.0	0.0
Ceylon	0.2	0.1	0.1	0.0
Canada	—	0.7	1.0	1.3
Others	1.3	3.2	2.7	2.8
TOTAL	73.4	53.8	54.9	34.5
Anthracite	3.0	3.5	4.1	3.3
Steam	53.6	37.2	36.5	24.3
Gas	11.5	6.8	6.6	3.0
Household	1.8	1.8	1.9	1.5
Others	3.5	4.5	5.8	2.4

IRON ORES.—The early iron industry of Britain was based, as it was in so many countries, on the abundance of charcoal for fuel rather than on the quality or vast reserves of iron ore. Hence the early centres included Sussex, where the Wealden forests furnished the necessary charcoal, and where ores of sufficient quality and in sufficient quantity were available. Another such area was South Wales. But with the coming of the industrial revolution and the substitution of coal and coke for charcoal, the centres of iron manufacture shifted. The subsequent prosperity of the iron and steel industry of the British Isles was consequent, to a large extent, on the association of iron ore and coal in the coalfields, and the availability of limestone near at hand as a flux. But this association is now also of the past: only one of the coalfields—North Staffordshire—has now an important output of ore. The most important iron ores are now the bedded, sedimentary iron ores of comparatively low grade but huge extent. The sheets of ore are but slightly folded, and being near the surface can be worked in large quarries or in shallow mines. The two chief areas are the Cleveland field of North Yorkshire and the Midland fields of Lincoln, Northamptonshire, and Rutland. The Cumberland and North Lancashire iron ores, mined especially near Barrow, are purer ores and occur as masses in limestone.

PRODUCTION AND RESERVES OF IRON ORE IN MILLIONS OF TONS

Field	Output in			Estimated reserves
	1925-29 (average)	1930	1933	
Cumberland and N. Lancs.	1.05	1.13	0.88	—
Jurassic :				
Cleveland	2.15	2.17	1.85	151.0
Midlands	6.34	7.80	9.56	1,828.0
Coal Measures (mainly N. Staffs)	0.31	0.35	0.17	940.0 (N. Staffs)
Other occurrences	0.13	0.18	0.23	—
TOTAL	9.98	11.63	12.70	

The iron ores imported into the United Kingdom although only half as much as the home-produced ores by weight, are almost double in value. Nearly half the imported ore comes from Spain, a quarter from Algeria and much of the remainder, high-quality ore suitable for cutlery steel, from Sweden.

METALLIC ORES.—Amongst metallic minerals the once famous tin fields of Cornwall have now but a small output. The main mining district lies to the north of one of the larger granite

masses, in the neighbourhood of the mining towns of Camborne and Redruth. The bulk of Britain's requirement is now imported, especially from Malaya, Nigeria, and Bolivia. Copper also came mainly from Cornwall, but the production is now quite insignificant, and it is difficult to realize that this county once produced three-quarters of the world's total. Associated with the tin ore of Cornwall is also some wolfram ore—from which is obtained the wolfram or tungsten used in the manufacture of certain types of steel. Lead ore is widely distributed in the British Isles, but the workings are all small, and lie mainly in northern England, the Isle of Man, Flint, Derbyshire, and the Lead Hills of southern Scotland. Zinc ore used also to be important from many of the same areas, but the mines of Cumberland, which used to produce 7,000 tons per annum, are now closed down.

NON-METALLIC MINERALS.—The British Isles are well supplied with building stones and road metal. Amongst the former may be specially noted the grey granite of Aberdeen and the handsome Shap granite of Cumberland; the magnesian limestones of the north-east of England; the Portland oolites and Bath freestones of the Portland and Bath districts respectively. Enormous quantities of limestone, including chalk, are burnt for the production of lime and Portland cement—the cement works using chalk on the lower reaches of the Thames and Medway are especially noteworthy. The china clay industry of Devon and Cornwall is also important; the china clay occurs as an alteration product overlying certain of the granite masses, but especially near St. Austell. Formerly clay for brickmaking was widely dug in many parts of the country, but there has been a marked tendency to the concentration of the industry in a few areas—notably at Peterborough. The fireclays and ganisters of the coal fields have, of course, special uses, and so have the pure white pottery clays such as those of Poole. The slates of North Wales and Devon-Cornwall are less important than formerly, owing to the decrease in popularity of slate as a roofing material. The decrease in importance of the Scottish oil-shales is partly the result of exhaustion, partly of the competition of foreign crude oils. The most famous area for salt is Cheshire. Mention should be made of the fine moulding sands of the Midlands, very important in the iron industry.

It may be noted here that Ireland is poor in minerals, which are practically restricted to small supplies of coal, aluminous iron ores, granite, and marble.

Climate and Weather.—In the section on the climate and weather of Europe as a whole, we have already dealt with the principal factors which go to determine British weather. We have noticed the outstanding importance of the three great pressure systems: in winter the low pressure over Iceland, the high pressure

over the Azores, and the high pressure over eastern Europe. Similarly, in summer we noticed the low-pressure system again over Iceland, but usually further north when compared with its winter position ; again there is a high pressure over the Azores, but this time with a tendency to be centred considerably farther north ; whilst in summer the winter high pressure over Russia is replaced by a great low-pressure system. When one looks at a map of Europe one notices that the British Isles tend to be centrally situated between the three great pressure systems ; and actually our weather is very largely determined by their relative strength. In winter there is a distinct tendency for the low-pressure system over Iceland to be most potent in determining the weather of these islands, except in those years when the high-pressure system of eastern Europe is exceptionally strong, and extends its influence as far as the east coast of Scotland and England. For example, in the winter of 1928-9, when settled cold weather prevailed for long periods at a time, with cold easterly or north-easterly winds, it was found that the pressure system of eastern Europe was extending its influence as far as these islands. It should be noticed that when one of the great high-pressure systems extends its influence in this way, there is a distinct tendency for the weather to remain settled for considerable periods of time. Thus in summer when the high-pressure system of the Azores stretches rather north of its normal position, there is a possibility that at least the south of England will enjoy long spells of fine weather. This happened in the summer of 1929. That summer was marked in northern Scotland, however, by an extended period of bad weather ; in other words, the path of the cyclones from the Atlantic lay along the northern fringe of the high-pressure system, which remained comparatively stable over southern Britain.

The variability of British weather is a byword, and one may say that for three-quarters of the year our weather is determined by the passage across the islands of a succession of secondary depressions or secondary cyclones with intervening ridges of high pressure. Since this is the case, it is desirable to examine in a little more detail the succession of weather which results. One must remember that a cyclone or depression in the Northern Hemisphere is marked by a low pressure centre with upward currents of air. Winds tend to blow towards this centre, and at the same time round the system in an anti-clockwise direction. When a depression, therefore, is approaching these islands from the Atlantic, the barometer will fall and the winds will be southerly to south-westerly, veering westerly later. Coming from the Atlantic they will be warm and moisture-laden ; blowing northwards towards cooler regions, and also towards the centre of the depression, where they will rise, rain tends to fall. After the centre of the depression has passed across the islands, the

barometer will again rise, but the normal air currents will now be colder winds from the north or north-east, but winds which are comparatively dry. The passage of such a depression is often followed by the passage of a ridge of high pressure, ushered in by a continuation of the cool, northerly winds and a steadily rising

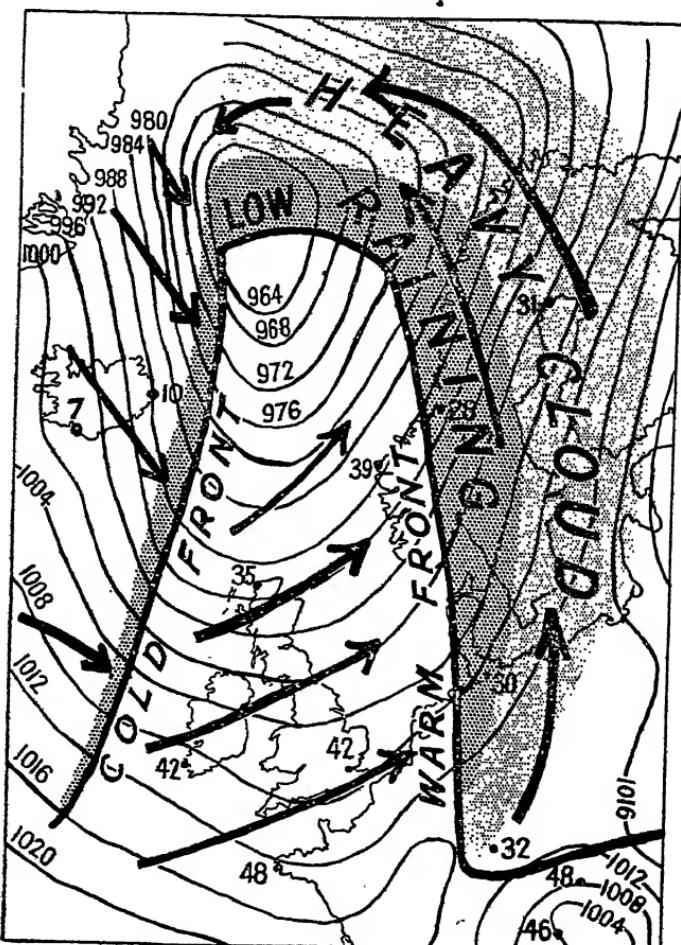


FIG. 60.—Britain under a cyclone. Saturday, February 21, 1931.
The dots with figures show temperature in degrees Fahrenheit. Rain is falling over the areas with heavy dots; there is heavy cloud over the lightly dotted area.

barometer. Fine sunny weather will result in the summer, but as the winds decrease and calm conditions prevail, the passage of such a ridge of high pressure is marred in winter by the occurrence of fog. The weather conditions accompanying the passage of low-pressure systems across these islands are illustrated in Fig. 60.

Turning now to the average weather or climatic conditions of the British Isles, one may say that these islands reflect in detail the conditions which prevail in general in Europe. In winter the west is warmer than the east, and the isotherm of 40° in January roughly divides the islands in two, and its course should be very carefully noticed. In summer, on the other hand, the south is warmer than the north, and the isotherm of 60° runs roughly from east to west. Thus these two isotherms divide the British Isles into four quarters. The south-east quarter (in the neighbourhood of London) is the most continental, that is, the centre for the greatest differences between summer

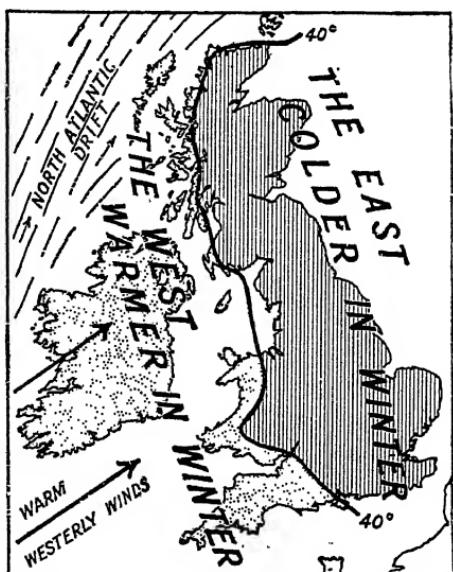


FIG. 61.—Map showing climatic conditions in the British Isles in January.

At this season a tract of the centre and north-eastern Ireland has also an average temperature below 40° F.

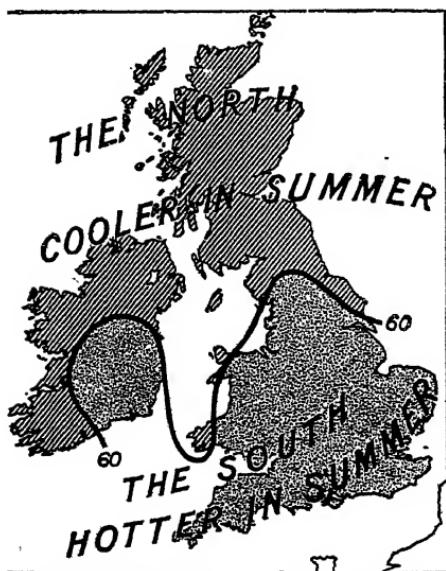


FIG. 62.—Map showing climatic conditions in the British Isles in July.

parts of western England and Wales, receive too much moisture,

and it is comparatively rarely that drought is a serious menace. Fig. 63 shows those parts of the British Isles which receive less than 30 inches of rainfall, and it will be noticed later that cereal farming—with the exception of that hardy crop, oats—is largely restricted

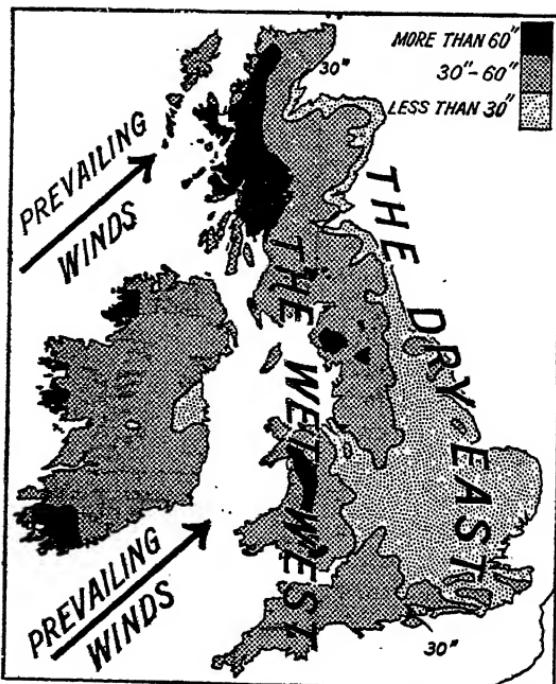


FIG. 63.—A simple rainfall map of the British Isles.

to the regions having less than 30 inches of rain per year. It has, indeed, been suggested that England can be divided into four agricultural provinces by using the 60° July isotherm and the 30

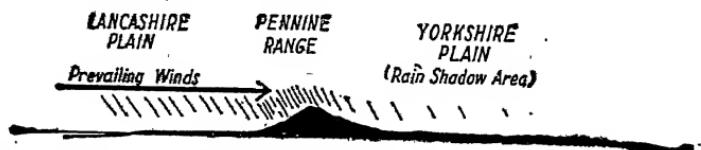


FIG. 64.—Section across the Pennine Range, showing the rain-shadow area on the east.

inches rainfall line. It is interesting to experiment with this on a map, and see how true this statement may be.

Natural Vegetation.—The natural vegetation of the British Isles has now been so largely removed that it is difficult to picture the country as it must once have been. Broadly speaking, the whole of the lowlands must have been clothed with thick, deciduous forests of oak, ash, beech, birch, and other common trees of the

countryside. Extensive tracts of marshland, such as the Fen country and Romney Marsh, formed a break in the spread of forests, and rising above both were the great tracts of the Welsh highlands, the Pennines, the Southern Uplands, and the Highlands of Scotland, with the grass-covered downs of the chalk country. It is necessary to remember that the winters are milder in the north-west of Scotland than in the south-east of England; so deciduous forest is just as characteristic there in the north as it is in the south, except where other factors intervene. Such other factors include winds, and the wind-swept hillsides of north-western Ireland or Scotland do not favour the growth of trees. Poor soils, such as the stony soils of much of Wales, the Highlands of Scotland, or the sandy tracts of the south of England, cause coniferous forests to replace the deciduous woodland. Even on low ground with poor sandy soil the heathlands which flourish here must have existed in times past much as they are at present. It is interesting to notice that the settlements and highways of the early Britons avoided the low ground, for this was only thick forest or marshes, and are found on the high ground, which is, at the present day, the location of comparatively few villages or towns. At the present day the ancient forests have been so largely removed that forests and woodland occupy a smaller proportion of the surface than in any other European country. But the British Isles still appear to be well wooded, because of the numerous small woods, hedgerows with isolated trees, and " park like " scenery so characteristic of the country. The following table shows the utilization of the surface in the British Isles :

	Woods and plantations	Rough grazing land	Permanent pasture	Arable	Other land
	per cent.	per cent.	per cent.	per cent.	per cent.
England	5	11	43	26	15
Wales	5	34	42	12	7
Scotland	5.6	67	8	16	3.4
Irish Free State . .	1.4	12	47	21	18
Northern Ireland . .	1.3	16	46	28	9

This table shows the very small area actually covered by woods and plantations in all parts of the British Isles. Nearly all the timber required has to be imported, yet there are millions of acres of moorland which might be planted with trees. More forest land is one of the greatest needs of Britain. Most of the " rough grazing land " is the heather-covered moorland and the heathland which covers such huge areas of the uplands. The high percentage in Scotland is particularly noticeable.

Agriculture.—The relative importance of agriculture in Britain is perhaps best gauged by noting the value of primary production compared with that for manufacture. These figures are for Great Britain before the Great Depression of 1931–33 :

	£
Agriculture (1923)	259,000,000
Fisheries (1923–31)	18,000,000
Mines (1929) ¹	197,000,000
Manufactures (1924)	3,853,000,000

The figure given above for agricultural produce is the value of produce sold off the farms (excluding, therefore, consumption in farmers' households) and is made up as follows :

	£
Farm crops	54,000,000
Live stock	95,000,000
Dairy produce	79,000,000
Wool	4,250,000
Eggs	13,500,000
Miscellaneous	13,000,000

In its broad lines the distribution of the different types of agricul-



FIG. 65.—Rough hill pastures in the British Isles.

ture in Great Britain is controlled by geographical factors ; in the

¹ The value of the mineral output has fluctuated widely in recent years owing to disturbances in the coal industry. The 1927 total was £207,000,000. Figures from *Statesman's Year Book*. 1930 : £188,000,000 ; 1933 : £152,000,000.

details of development, especially in recent years, the economic factors are more noteworthy. The three maps, Figs. 65-67, illustrate the first point. Most of the hilly western counties of England, Wales, and large parts of Scotland have nearly half their surface occupied by moorland—or “rough hill pasture.” Turning to the plains of the Midlands and south-eastern England, Fig. 65 shows

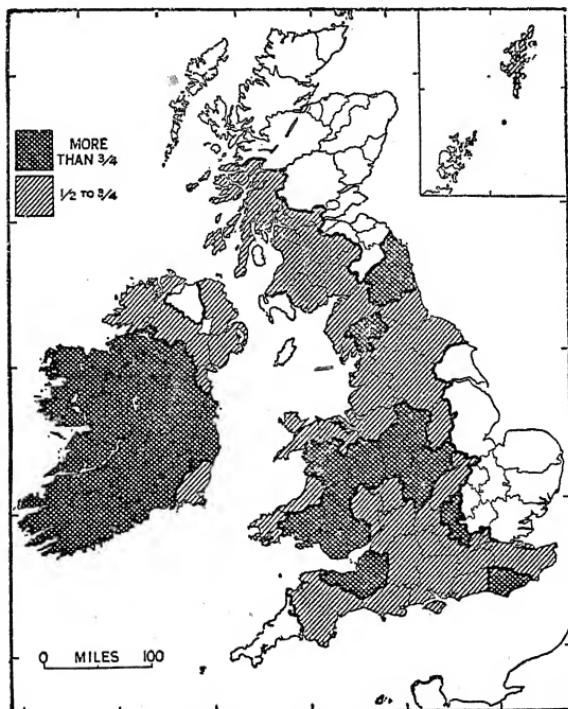


FIG. 66.—Permanent grass in the British Isles.

Each county in the shaded area has more permanent grass than ploughed land.

that permanent pasture occupies more than half the total area in most of the damper, western counties of the Midlands; arable land more than half the total area only in the drier eastern counties (Fig. 66).

An essential characteristic of the intensive agriculture of Great Britain is the crop rotation. There are three main systems which have been practised; two are still used:

	Medieval	Old Norfolk system	Modern
1st Year	Fallow	Clover	Clover, or rye grass
2nd Year	Rye or wheat	Wheat	Wheat
3rd Year	Barley or peas	Turnips	Potatoes, or root crop
4th Year	—	Barley	Oats, or barley
5th Year	—	—	Barley

Clover or other leguminous crops are very important factors in the scheme since, as a result of bacteria living in their root nodules capable of "fixing" atmospheric nitrogen and converting it into nitrogenous plant foods, they *add* to the fertility of the soil instead of detracting from it.

Mixed farming with high crop-yields is thus characteristic of British agriculture. There has been a steady decrease in area of arable land in the last half-century, only partly offset by the increased importance of dairy-farming. The causes are economic.

Wheat.—Wheat occupies about 1,600,000 acres (1923–1927)¹ in

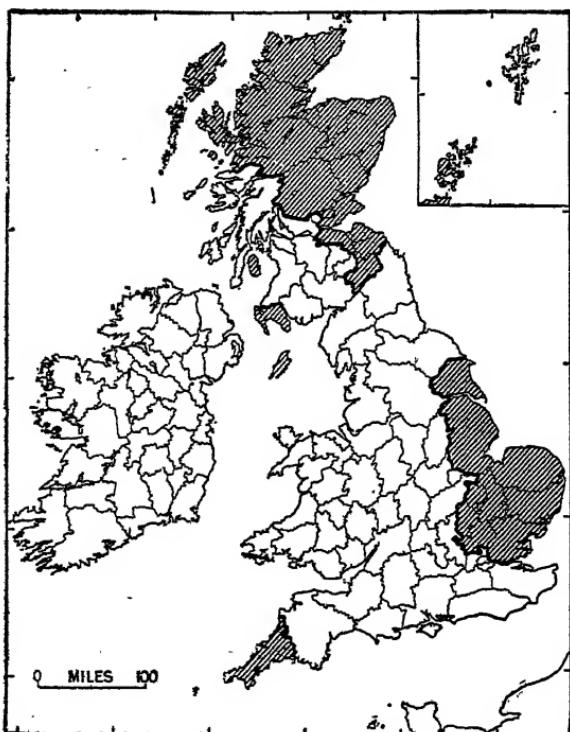


FIG. 67.—Arable land in the British Isles.

Each county in the shaded area has more ploughed land than permanent grass.

England and Wales, but only about 55,000 acres in Scotland, where the northern limit for its cultivation is reached, and 30,000 acres in Ireland, which is, on the whole, too damp. The average yield is 31.5 bushels of 60 lbs. per acre, so that Britain grows at home roughly $1\frac{1}{2}$ million tons compared with an import of over 5 million tons.

Barley.—Barley occupies now less than 1,000,000 acres in

¹ Acreage under wheat decreased to between 1,300,000 and 1,400,000 in 1929 and 1930, and to 1,200,000 in 1931. A wheat subsidy was then introduced and the acreage rose to 1,772,000 in 1935 and in Scotland to 101,000.

ngland and Wales; less than 100,000 acres in Scotland and only little more in Ireland.

Oats.—Oats alone cover 1,400,000 acres in England and Wales, early 800,000 acres in Scotland, and nearly 1,000,000 acres in Ireland. The ability of oats to withstand the cooler, damper climate of the north and the damper climate of Ireland is well shown.

Root Crops.—Turnips, swedes, and mangold (all largely used for cattle and sheep food) occupy nearly 1,000,000 acres in Great Britain and a further 350,000 acres in Ireland. Potatoes, occupying 50,000 acres in Great Britain, cover no less than 550,000 in Ireland.

Hay.—Hay and fodder crops cover more than 6,000,000 acres



FIG. 68.—The wheatlands of the British Isles.

Notice that they are mainly in the dry south-east; the west of England is too wet, Scotland is too cold.



FIG. 69.—The oat-growing regions of the British Isles.

Oats, like wheat, grow in the drier east, but they can ripen under colder and damper conditions than wheat, and so are largely grown in Scotland.

In England and Wales, nearly 600,000 acres in Scotland, and more than 2,750,000 acres in Ireland.

Peas and Beans are other important crops; in recent years sugar beet has been growing rapidly in importance in the dry eastern counties of England. The *flax* of north-eastern Ireland now occupies less than 10,000 acres (1933).

Orchards.—Fruit orchards occupy 250,000 acres in England and Wales, 1,100 acres in Scotland. Special mention may be made of the cider-apple orchards of Herefordshire, Devon, and Somerset, and of the fruit orchards of the "home counties" supplying the London markets. Kent, along the fertile northern slopes of the North Downs, is *par excellence* the county for "small fruit"—raspberries, strawberries, currants, gooseberries, etc.—which cover 30,000 acres in England and Wales, and 9,500 in Scotland (mainly in the sheltered valleys of the east coast). Hops are mainly of importance in the Weald of Kent and in Herefordshire (18,000 acres in England, none in Scotland). Fruit and vegetable canning has recently become very important especially in the Fens and the south-east.

Live Stock. Horses.—With the increase in motor transport and the mechanization of farming, horses are rapidly decreasing in numbers. In 1934 there were only a few over 1,000,000 in Great Britain (excluding Ireland).

Sheep.—England has long been famous for wool of excellent quality—so excellent that there was still, until very recently, a small export for special purposes to the United States—and sheep number about 17,000,000 in England and Wales; 7,600,000 in Scotland (1934); and 4,000,000 in Ireland. There is a somewhat remarkable specialization, and distinct breeds tend to be strictly localized. The famous Lincoln and Leicester breeds are localized to a considerable extent in those counties; the Southdown on the chalk downs of the southern counties; the Romney Marsh on that damp flat stretch in southern Kent. The chalk downs afford some of the finest pasture in the country; the sheep which are bred on the rough hill pastures of Wales and Scotland tend to be inferior in the quality and yield of both wool and, sometimes, mutton. It is, however, dangerous to generalize too far, since “heather fed” Scottish mutton has a very high reputation.

Cattle.—There are 6,500,000 cattle in England and Wales; 1,300,000 in Scotland; and over 4,700,000 in Ireland. It will be noted that in Ireland cattle outnumber sheep, for the damp pastures of that island are pre-eminently suited to cattle rather than sheep. Broadly speaking, half the cattle in the British Isles are classed as “beef cattle,” half as “dairy cattle.” In Great Britain the dairying industry is directed in the first instance to supplying the huge demand for milk—the production of 1930–31 was estimated at 1,425,000,000 gallons—and, secondly, for butter and cheese. Formerly the seats of the dairying industry were dictated by the existence of suitable rich, damp pastures; latterly the prime factor is one of markets and marketing arrangements—hence the now very important dairying industry in the dry eastern county of Essex near the great metropolitan area of consumption.

Pigs.—Although there are more than 3½ million pigs in Great Britain and nearly 1½ million in Ireland, the bacon industry is not as prosperous as it should be, and pork and ham are of greater importance than bacon.

Fisheries.—The fisheries of the United Kingdom employ about 62,000 men—or in all give employment to double that number. The annual catch is about a million tons, worth about £15,000,000, but a considerable proportion of this is from distant waters. Herrings comprise half the catch, cod 15 per cent., and haddock 10 per cent. No less than 27 per cent. (1930–34) of the whole catch is exported. By far the richest fishing grounds are in the North Sea, so that the leading fishing ports—Grimsby, Aberdeen, Hull, Yarmouth, and Lowestoft—are all on the east coast. The

chard fisheries were formerly important off the south-western peninsula; there is a considerable amount of fishing in the Irish Sea (port: Fleetwood). Oysters are important at Whitstable and the Essex coast, the annual value of shell-fish being nearly £00,000 (1930-34).

Population.—At the census of 1931 no less than 80 per cent of the population of England and Wales (32 million out of 39·95

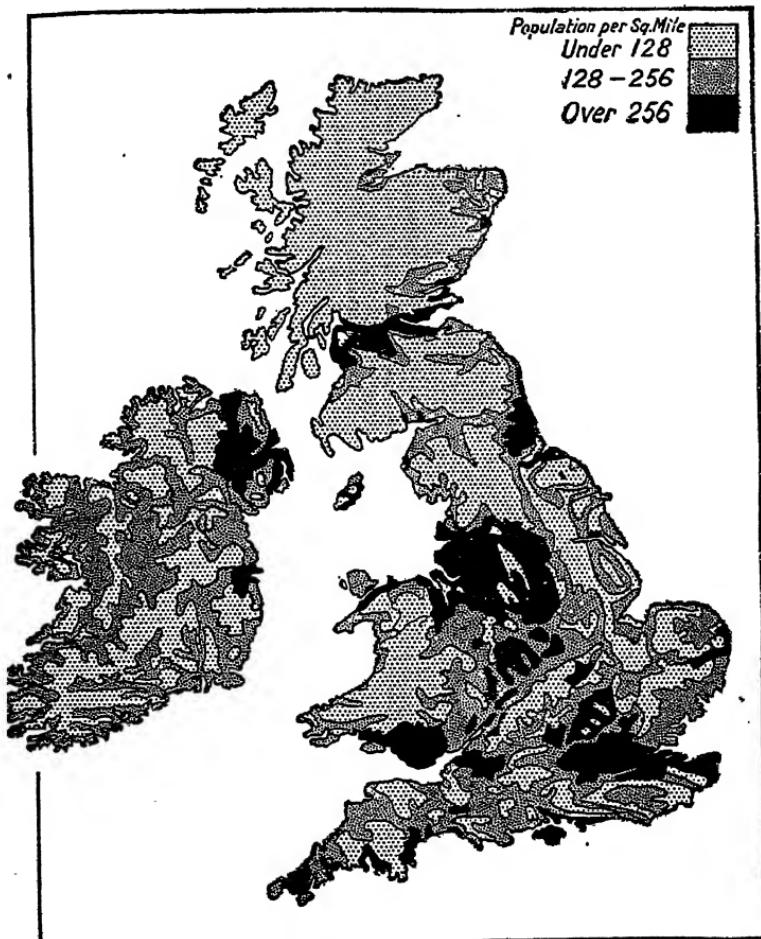


FIG. 70.—The population of the British Isles.

The three divisions correspond roughly with industrial, good agricultural and poor agricultural (million) were classed as "urban," leaving only 20 per cent. rural. The latter percentage is steadily decreasing. In Scotland the corresponding percentages are 80·1 and 19·9. In England and Wales no less than 47 boroughs (and in Scotland 4) were found in 1931 to have populations exceeding 100,000—more than in India, with a total population of 353,000,000. In Great Britain only

about 8 per cent. of the population are farmers ; by far the greater number are concerned with manufacturing industries, commerce, and transport service.

A hundred and fifty years ago when agriculture was the leading occupation, the only thickly populated counties of England and Wales were the agricultural lands of the south-east and Midlands. With the coming of the Industrial Revolution the coalfields became the areas of densest population, and to a large extent have remained so up to the present day. It is difficult to get from the census of Britain a proper idea of the size of towns because of the somewhat peculiar divisions which are adopted : thus the city of Manchester had a population in 1931 of 766,000, but the county borough of Salford is really an integral portion of the same thickly populated area, and its population ought really to be included with that of Manchester ; hence it is better to consider for England the population of what are known as conurbations, a group of urban areas which are situated close together. The leading conurbations which ought to be studied from the geographical standpoint are Glasgow and Clydeside, Liverpool and Birkenhead, Manchester, Leeds, Newcastle and Tyneside, Birmingham, Swansea, Cardiff, Hull, and London. The concentration of most of these great urban areas on or near the coalfields needs no comment, but with the increasing use of electric power there is now a marked tendency to decentralization. Many industrial centres are no longer situated on the coalfields, and in particular there is a marked increase in the industrial region of the south of England.

Manufactures.—Two features are characteristic of the distribution of manufacturing industries in the British Isles. One is the marked coincidence of the great industrial areas with the coalfields, and the other is the marked specialization of individual areas. The first point will be made clear by comparing Figs. 71 and 54. It is true that the increased use of electricity, in particular, is promoting decentralization, but the change is only beginning to be widely manifest and is marked by the increasing importance of factory industries in the south-east. The second point is illustrated very roughly in Figs. 71 and 70.

Textiles.¹—The products of the various textile industries make up nearly 40 per cent. of the total value of British exports of home origin (1909–13, and 1924). The percentage was 30 in 1934.

The *cotton industry* is the greatest yet in England ; the spinning and weaving of cotton are almost restricted to the west side of the Pennines, mainly to that part of Lancashire which lies south of the Ribble, and in Scotland to Glasgow and other manufacturing towns of the west. The damper atmosphere west of the Pennines

¹ The figures quoted in this section are those for 1924, the date of the last full Census of Production prior to the great period of depression. The 1930 Census shows much lower figures throughout.

once a factor in this localization. Manchester (with Salford) is the great centre; Oldham and Bolton are great spinning towns, while Burnley, Blackburn, Preston, Bury, and Rochdale are weaving towns. For its supplies of raw cotton Lancashire is still only dependent on Liverpool, but supplies come also direct to Manchester by the Ship Canal. According to the 1924 Census of Production, Britain produced cotton yarn to the value of £187 millions (of which 11.8 per cent. were exported), and piece goods



FIG. 71.—The industrial regions of Great Britain.

Notice that they are nearly all situated on coalfields.

the value of £157 millions (of which 85.7 per cent. were exported). Miscellaneous cotton manufactures totalled £12.7 millions.

The woollen industry is centred in the West Riding of Yorkshire, especially around Leeds. The narrow dales to the west of Leeds are filled with larger or smaller manufacturing towns engaged in the industry, for the most part established in the Middle Ages when suitable water for scouring, supplies of fine, lustrous wool from the neighbouring moorland pastures, and the low cost of living, were the great advantages offered by these locations. Bradford is the great worsted centre; other towns engaged in various branches

of the woollen industry are Halifax, Huddersfield, Dewsbury, Wakefield, and Barnsley, with hosiery in the Midland towns such as Nottingham and Leicester. In Scotland several towns in the basin of the Tweed are famous for the fabrics known as "tweeds." Other woollen manufactures are carried on in towns of the coalfield regions. In Ireland woollen manufacturing is largely limited to Belfast.

The *silk industry* is pursued mainly in Derbyshire and the neighbouring parts of Staffordshire and Cheshire, at Derby, Ilkeston, Chesterfield, Macclesfield, Congleton, and Leek. The output of silk goods (£9·4 millions in 1924) is now less than that of artificial silk (£10·4 millions in 1924), and in view of the fact that many cotton and woollen firms now manufacture the latter, it is widely distributed.

Jute fabrics are manufactured mainly at Dundee.

Iron and Steel.—Iron and steel and their products make up nearly 20 per cent. of British exports of home origin. The "heavy industries" have suffered a period of depression since the war, from which they have only recently recovered, but even so the Census of Production, 1924, gave the output of pig-iron at £35·0 millions and steel at £149·6, quite apart from the value of the innumerable products. The chief seats of iron-smelting are at and around Middlesbrough (N. Yorkshire) and South Durham; in South Wales, including Newport; in North Lancashire and Cumberland (Barrow, etc.); and on the Midland iron fields. In connection with the manufacture of articles made from iron, two towns in England are especially noteworthy—Birmingham and Sheffield (each with the surrounding district). Shipbuilding is associated with the iron and steel industry especially in the Clyde area, the chief seat of shipbuilding in all its branches in the world; along the Tyne, Wear, Tees, and at Belfast. Railway rolling stock is manufactured at works the location of which is largely determined by the requirements of the railway companies concerned—at Crewe, Swindon, etc. The motor-car industry is especially important at Coventry, Birmingham, and Oxford. The tin plate industry is centred at Swansea in the South Wales coalfield.

Other Industries.—The making of earthenware and porcelain is associated with the "Pottery towns" of Stoke, Burslem, and their neighbours on the North Staffordshire coalfield. Alkalies, chemicals, and glassware are important in Cheshire (associated with salt deposits) and South Lancashire (St. Helens, Warrington, Widnes, etc.), and Tyneside. The leather industries are important at Northampton, Leicester, Stafford, and other Midland towns. Paper is manufactured especially where conditions are suitable for the receipt of the bulky raw material and where there are adequate supplies of pure water. North Kent and the Thames estuary have become leading areas.

Communications.—Inland waterways, if we except the very important Manchester Ship Canal, are relatively unimportant in the British Isles, and only carry about $\frac{1}{25}$ th of the traffic handled by the railways. Great Britain has 20,400 miles of railways, grouped since 1923 into four systems—the London, Midland and Scottish (7,464 miles in 1923); London and North Eastern (6,464 miles); Great Western (3,765 miles); and Southern (2,129 miles).

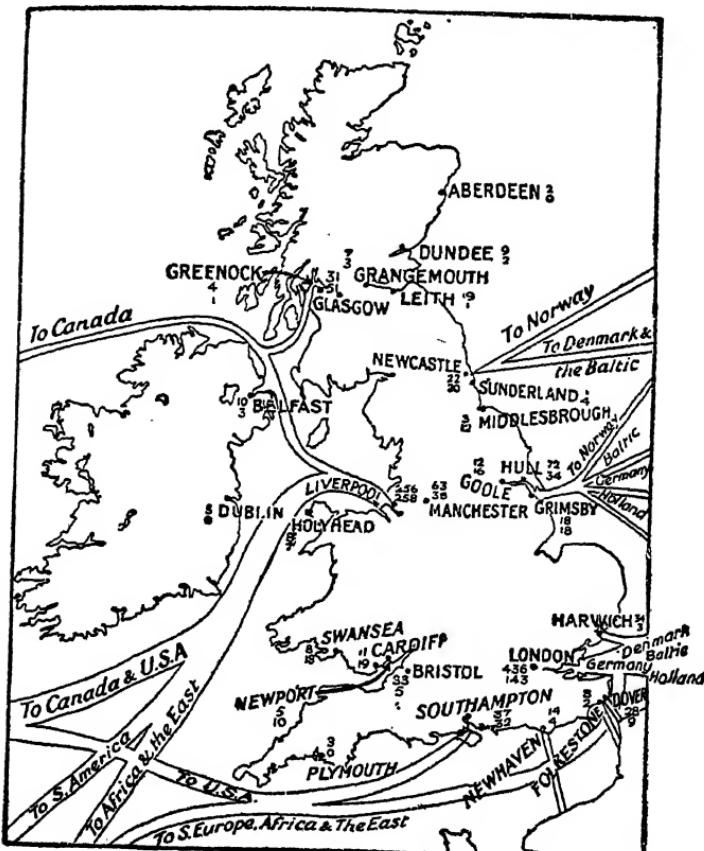


FIG. 72.—The ports of the British Isles.

Notice the favourable position of London, opposite the continent of Europe. The upper figures in each case show the value in millions of pounds sterling of the imports; the lower figure the value of the exports (post-war averages).

It is impossible here to give details of the railways; they should be studied in relation to their direction from the great focus, London, and to the great ports which they serve. The increased efficiency of motor transport and the very excellent road system of the British Isles have led, in the last few years, to greatly extended use of the roads both for passenger and goods traffic.

Ports.—Fig. 72 has been drawn to show the principal ports

of the British Isles. The figures marked against each port show the value, in millions of £ sterling, of the foreign trade.

They demonstrate at once the overwhelming importance of

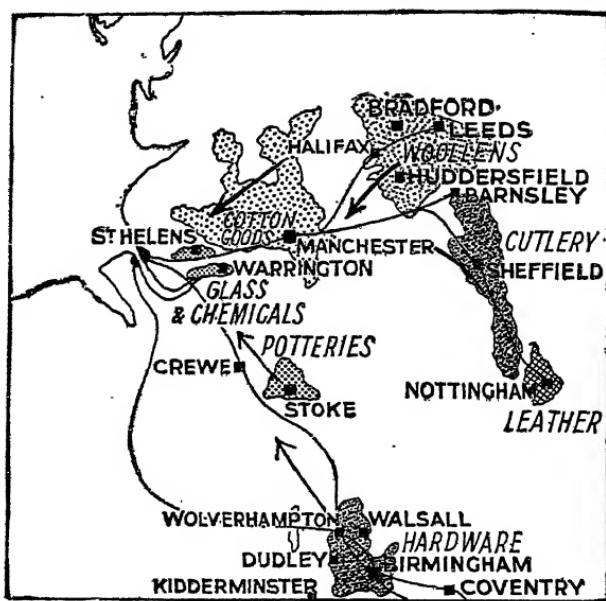


FIG. 73.—The products of the hinterland of Liverpool.

London (579) and Liverpool (514), the next in order being Hull (106), Glasgow (82), and Manchester. These figures should only

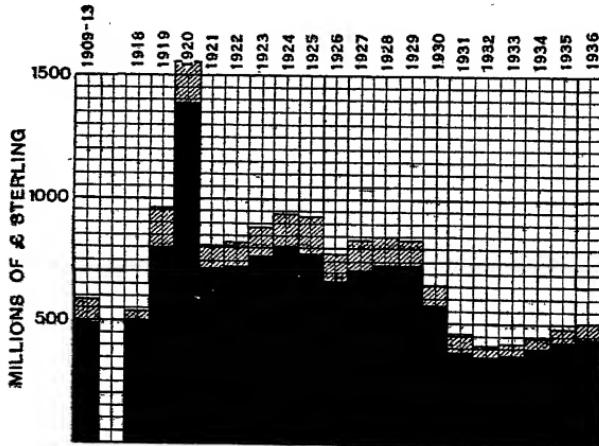


FIG. 74.—The exports of the United Kingdom.

Exports of domestic origin in black; exports of Colonial and foreign origin shaded.

The figures for 1920 (in millions of £) total 1,557. Domestic 1,384.

be taken as a rough guide since they change considerably from year to year.

London receives between 33 and 40 per cent. of the imports, deals with over 25 per cent. of the exports, and handles no less than half the entrepôt trade which is so characteristic of Great Britain. Its situation at the head of ocean navigation of a river which allows access a considerable distance into the interior, nearly opposite the greatest of continental rivers, the Rhine, no doubt determined its early growth and hence indirectly made it the capital of the

1921-25.

FOOD	RAW. MAT.	MANUFACTURES								OTHERS
		COTTON GOODS	IRON & STEEL	MACHI- NERY	WOOLLEN GOODS	COTTON APPAREL	APPAREL	CHEMICALS	METALS	
10	30	30	40	50	60	70	80	90	100	

FOOD	COAL & COKE	OTHERS	COTTON GOODS	IRON & STEEL	MACHI- NERY	WOOLLEN GOODS	COTTON APPAREL	APPAREL	CHEMICALS	METALS
			RAW MAT.							

1926-30.

FIG. 75.—The exports of the United Kingdom.

country, a position which favoured its further increase. The whole port, from the tidal limit at Teddington to the mouth between the Isle of Sheppey and Essex, is under the control of the Port of London Authority.

Liverpool has risen to high rank only within the last 200 years.

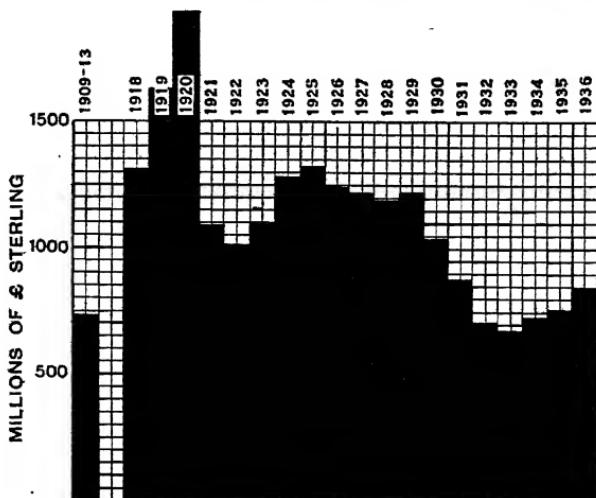


FIG. 76.—The imports of the United Kingdom.

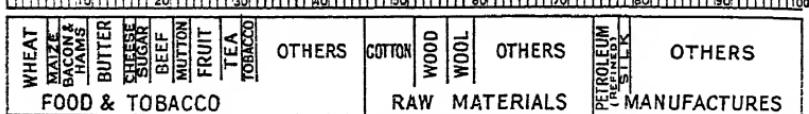
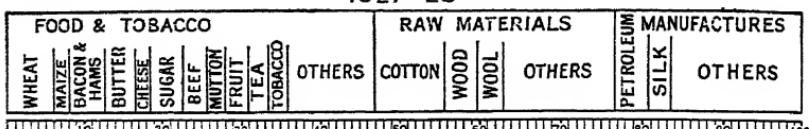
The figures for the years 1919 and 1920 (in millions of £): 1919, 1,628; 1920, 1,936.

Figs. 73 and 94 illustrate the industrial regions situated in its hinterland, regions which are connected with the port by rail. In addition it is necessary to remember the position of the Manchester Ship Canal.

Hull is another of the older ports of England. Most of the ports have a foreign trade which is localized and determined by the regular steamship lines which serve them. Some attempt has been made to indicate this in Fig. 72.

Foreign Trade.—One of the most striking features of British

1921-25

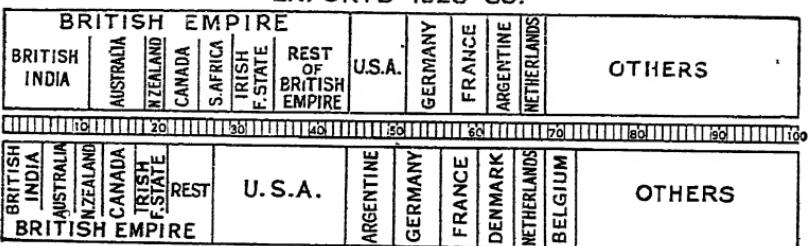


1926-30

FIG. 77.—The imports of the United Kingdom.

foreign trade is the large excess of the value of the imports over the exports. The "invisible" exports which pay for the excess include receipts from overseas investments (about one-half the total), receipts from shipping (about one-third), and others. Another

EXPORTS 1926-30.



IMPORTS 1926-30

FIG. 78.—The direction of the foreign trade of the United Kingdom.
(General trade: imports include re-exports; exports include British, foreign, and colonial produce.)

striking feature is the huge entrepôt trade; a third, the high place taken by foodstuffs among the imports and cotton manufactures among the exports. The diagrams should be studied with the greatest care.

THE NATURAL REGIONS OF THE BRITISH ISLES¹

The Highlands of Scotland.—Scotland north of a line drawn obliquely across the country from the mouth of the Clyde

¹ In this section extensive use has been made of "Great Britain: Essays on Regional Geography by Twenty-six Authors," edited by A. G. Ogilvie, 1928, 2nd edition, 1930. See also Stamp and Beaver, "The British Isles."

to Stonehaven is occupied almost entirely by a great mass of highlands. The valleys and coastlands of the east are the most fertile and populous parts of this area, and differ widely from the main mass of the Highlands.

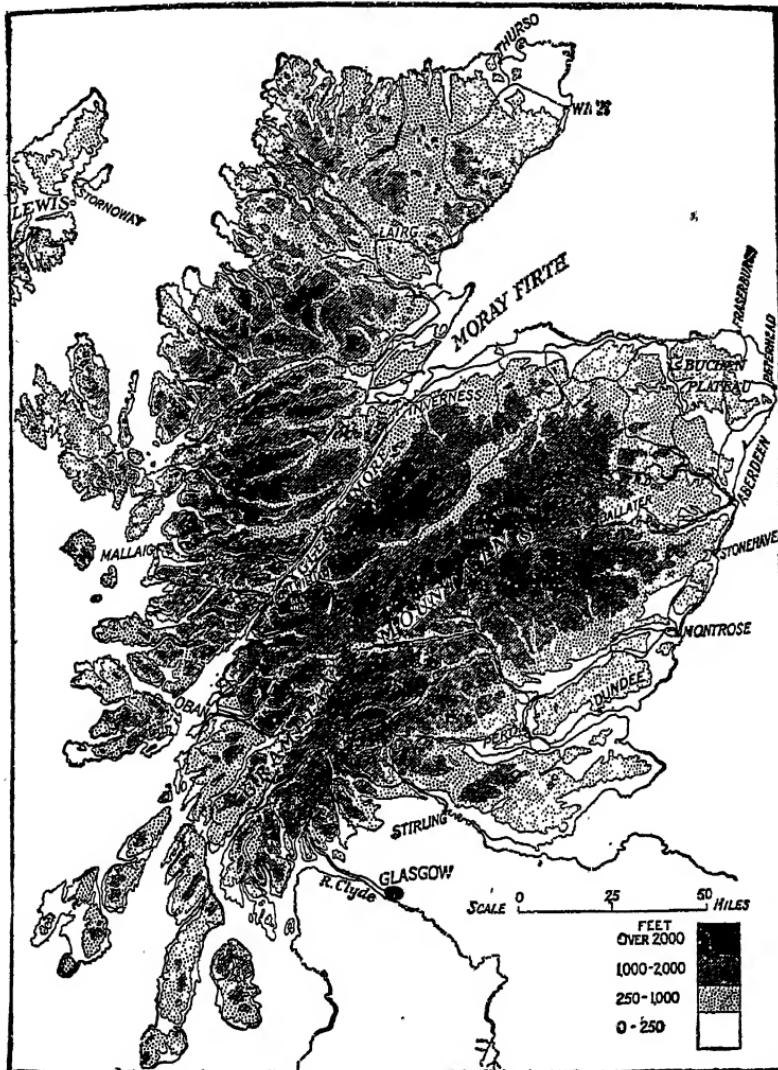


FIG. 79.—The Highlands of Scotland.

The Highlands may be described as a great plateau of ancient rocks. Although the rocks include gneisses, schists, slates, quartzites, and other metamorphic rocks of varied nature, together with innumerable intrusive masses of granite, intrusive veins and dykes, and, in some parts of the west, extensive flows of lava, it is note-

worthy that the scenery does not change greatly with variations in rock-character. Over the whole there is the same general dissected plateau character. The famous Old Red Sandstone of Scotland is found in some of the broader valleys, such as around Moray Firth, and may give rise to areas of good soil and cultivated tracts. The hills tend to be rounded in their outlines and to reach a common level. Large areas lie between 2,000 and 3,000 feet, a large number of points lie above 3,000 feet, but only half a dozen reach over 4,000 feet. The latter include Ben Nevis (4,406), the highest point in the British Isles, Cairngorm, and Ben Macdhui. Some geologists believe that the smoothing of the Highlands is the result of marine denudation, and point out that apparent wave-cut platforms can be detected at lower levels, especially at 1,000 feet, on part of the west coast. Whatever its origin, the original plateau has been very deeply dissected. In the heart of the Highlands great hollows are occupied by gloomy, forbidding lakes, and on the west coast deep fiords, occupied by arms of the sea, run far into the land. The "grain" of the country is predominantly from north-east to south-west—the well-known Caledonian trend. This is the direction of the great Glen More, which cuts right across Scotland and divides the Highlands into two groups—the North-West Highlands and the South-East or Central Highlands, or Grampians. Authorities differ concerning the origin of the valleys and "lochs"; they appear to be valleys along faults or lines of weakness in the crust which were occupied by small streams before the Ice Age and were deepened by glaciers during that period. The sea-lochs of the west are, at least, typical fiords, with steep sides going directly into deep water; sharp, almost right-angled bends; and often with a bar only covered by a few feet of water near the mouth or entrance. The ice-cap also is responsible for many of the rounded outlines of the Highlands and for sweeping away any pre-glacial soil.

Climatically, three parallel strips may be distinguished. The western strip has a heavy rainfall, almost everywhere over 60 inches a year; the summer is humid and short. The central strip is rather drier, the winter colder (below 40° in January), but the summers still damp and cool. The eastern coastal strip is definitely drier (see Fig. 63), and though the winters are cold and the summers cool, the larger amount of sunshine benefits agriculture.

Small mineral deposits occur in various parts of the Highlands, but there are no workings of importance. Agriculture and fishing are therefore the two main occupations. Nearly all the uplands are covered with moorland—mainly grass moors in the wetter west, heather moorland in the centre; many of the valleys or depressions are occupied by bogs, where the acid nature of the soil makes cultivation impossible and where the low elevation prevents drainage. It follows that agriculture is restricted to small, scattered

areas in the more favoured parts of the glens or near the sea, where fishing can also be carried on. Leaving on one side for the moment the more favoured east coast, the human settlements in the Highlands are small, compact, and widely separated ; the system of

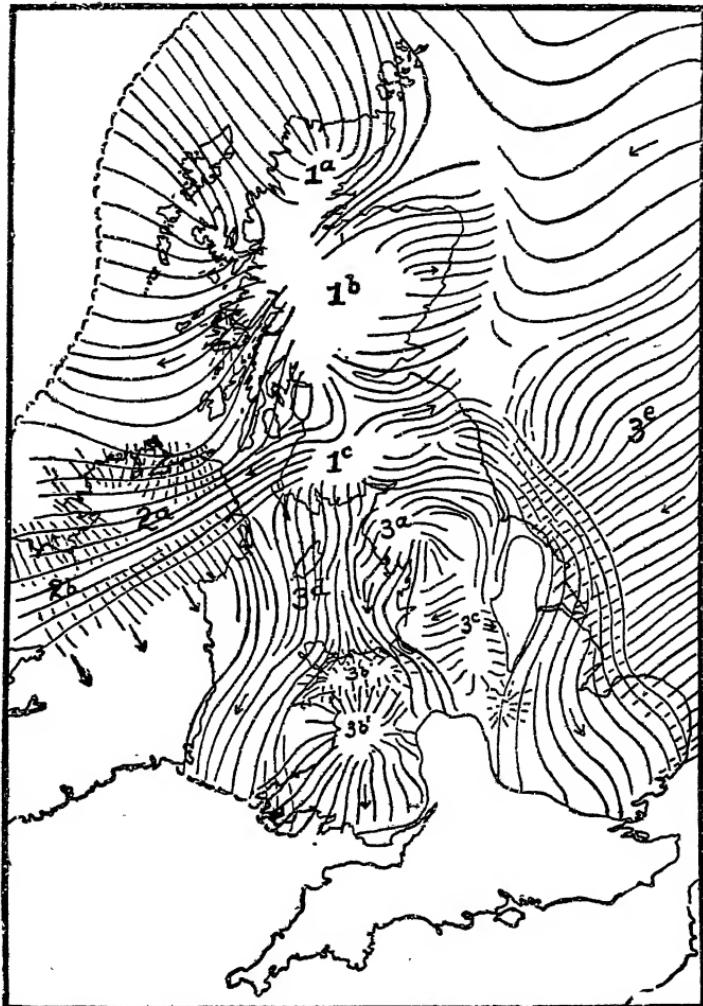


FIG. 80.—The glaciation of the British Isles.

(From Stamp's "Introduction to Stratigraphy," by permission of Thos. Murby & Co.)
The numbers show the centres of the old ice-caps. Where an area has been affected by more than one ice-flow, the broken lines show the older.

agriculture is that known as the Crofting System. Each patch of ground, the holding of a family, supplies that family with all its essential requirements—food, fire, and wearing apparel. The average farm is only about five acres—excluding, of course, the hill

pastures over which the few sheep and cattle can roam. It is little wonder that there is rarely a greater population density than 50 to the square mile, and that the crofters add fishing to their activities whenever possible. The famous "homespun" tweeds are produced by the villagers from yarn spun from local wool. The only other surplus exportable is young stock—young cows or bullocks. Many of the little towns, such as Lairg, consist essentially of an inn and market place for the accommodation of man and beast in this trade. There are few inland towns or even large villages in the Highlands; on the west coast are Oban and Mallaig, both rail

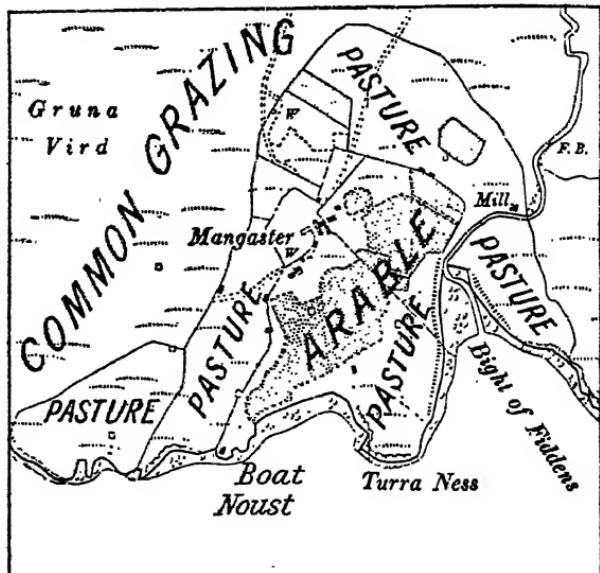


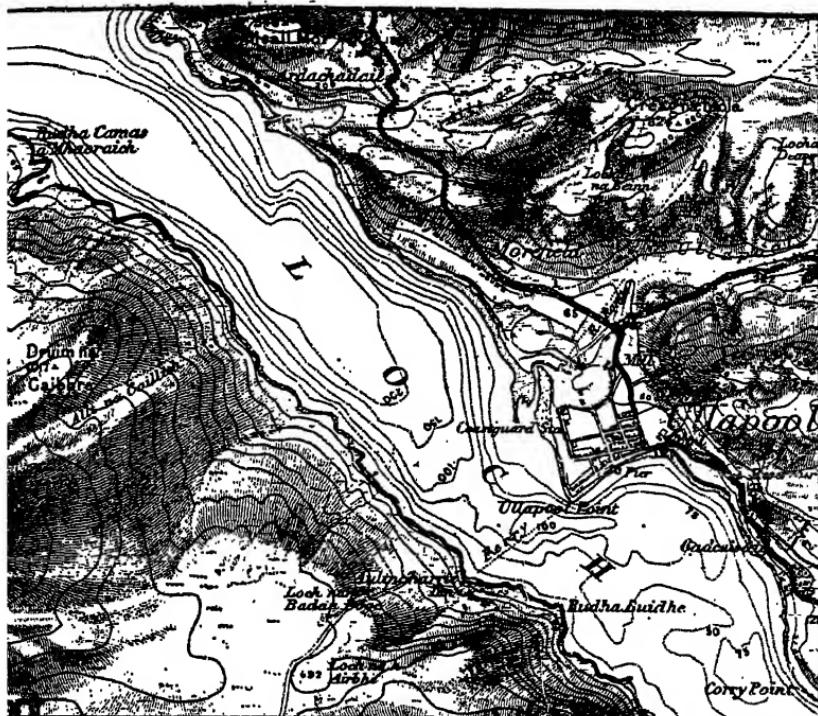
FIG. 81.—Map of a typical croft (Shetland Islands).

Notice the water supply (by wells) and the two approaches to the croft—one by land by rough tracks, the other by sea. The corn grown on the patch of arable land was formerly ground by a water mill—most of these mills are now disused. Scale of map, 6 inches to one mile.

heads. The once flourishing little town of Stornoway in the island of Lewis has suffered from the introduction of steam trawlers, which make it more economical to land fish on the mainland rather than at a small port in an island. Although the lakes which occupy the deep trench of Glen More have been connected by the Caledonian Canal, which can be used by small steamers, this line of communication between the east and west coasts has never been of great importance. The nodal towns of Fort William and Inverness at either end are of greater significance in connection with north-south land routes. Recently there has been an important development of hydro-electric power just north of Fort William. The water is brought by a long tunnel right through the heart of Ben Nevis.

There are other power works at Kinlochleven (south of Fort William) and northwards along Glen More. Mention must be made of the use of the Highlands as "deer forests" and grouse moors, the annual influx of sportsmen bringing considerable wealth to the region.

North-East Scotland.—North-east Scotland, or the east coast from Stonehaven northwards, differs considerably from the Highlands proper. In the Dee and Don valleys, the Buchan plateau, and around Moray Firth there are considerable areas sufficiently



(From the 1-inch Ordnance Survey Map, by permission of the Controller of H.M. Stationery Office.)

FIG. 82.—A Highland village site on one of the western fiords.

Notice the steep glaciated sides of the fiord and the shallow "lip" near the mouth of the fiord (opposite Ullapool Point). There is little flat land along the sides of the fiord; usually the steep sides go straight down into deep water. Hence where there is a level tract a village or town grows up, as Ullapool has done.

evel for cultivation; the soils are thin and light, but often rich in plant food. Oats, turnips, and grass are the main crops. The second great industry is fishing, and formerly every little harbour along the coast had a fishing fleet; but the industry is now concentrated in the larger centres, especially Aberdeen, Peterhead, Fraserburgh, and Wick. The great centre of the whole region is Aberdeen, the "capital of the north," with a considerable foreign trade. The working of granite is important in the neighbourhood.

The Orkney Islands are low islands built up largely of Old Red Sandstone like that which surrounds the Moray Firth. As a result half the islands are under crops and grass and 50 per cent. of the people are engaged in agriculture.

The Shetland Islands, on the other hand, are more rugged, and consist largely of metamorphic rocks like those of the Highlands. Agriculture is less important—though the rough hill pastures are famous for their “Shetland ponies”—but fishing much more so



FIG. 83.—Arable land of Scotland.

This map shows at least one reason for differentiating the natural region of north-east Scotland and illustrates the effect of the drier, sunnier climate of the east coast as a whole.

than in the Orkney Islands. Lerwick, the chief town, is the port and principal fishing centre.

The Midland Valley of Scotland.—Central Scotland has always been the most important part of the country, and at the present day supports three-quarters of the total population. The region is well defined on the north by the abrupt edge of the Highlands along the Highland Boundary Fault, and rather less clearly on the south.

Geologically, the Midland Valley is a broad syncline of sedimentary rocks let down between the older rocks of the Highlands

in the north and the Southern Uplands on the south. The youngest rocks are near the centre of the syncline, the older ones along its margins. Consequently there is a broad belt of Old Red Sandstone along the northern margin, and a narrower, less continuous belt along the south. Carboniferous rocks occupy the centre, but owing to folding and subsequent denudation the coal-bearing beds are restricted to the three basins shown in Fig. 84—the Lothian-Fife basin, the Ayrshire Basin, and the Central Basin. The greatest production is from the Central Basin, but the largest reserves are

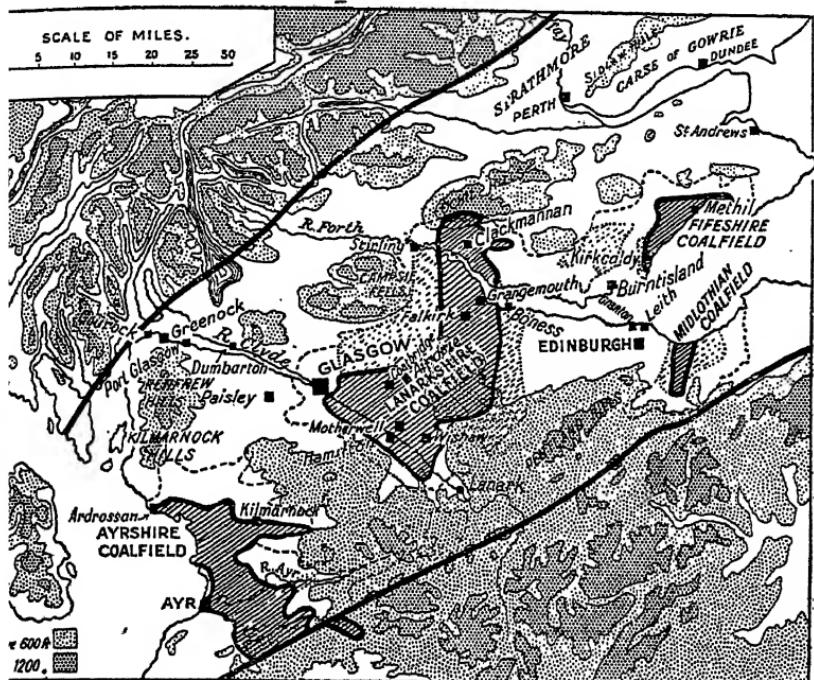


FIG. 84.—The Midland Valley of Scotland.

heavily lined areas are the coalfields of coal measure age; their extensions with older and usually poorer coals, where workings are at present, have been indicated by broken lines. The extreme limits of the fields are shown by a broken line. This shows that there is really one large field in the heart of the Midland Valley.

the eastern basin, though much of the coal lies under the firth of Forth. The famous oil-shales of Scotland from which large quantities of oil, wax for candles, and the important by-product phosphate of ammonia have been obtained in the past, but which are now almost exhausted, lie in the eastern basin. Other economic minerals include fireclay and iron ore. In both the Old Red Sandstone and Carboniferous Rocks there are large areas of volcanic rocks which have been more resistant to weathering than the surrounding sediments and so stand up as hill masses. Consequently central Scotland is far from being a plain. There is a central low-

land belt in which lie the coalfields; then a belt of hills built of volcanic rocks on the north—the Dalry, Renfrewshire, Campsie, Ochil, and Sidlaw Hills—separated from the Highlands by a series of valleys of which Strathmore is especially famous. On the south of the central depression there is also a line of hills, less clearly

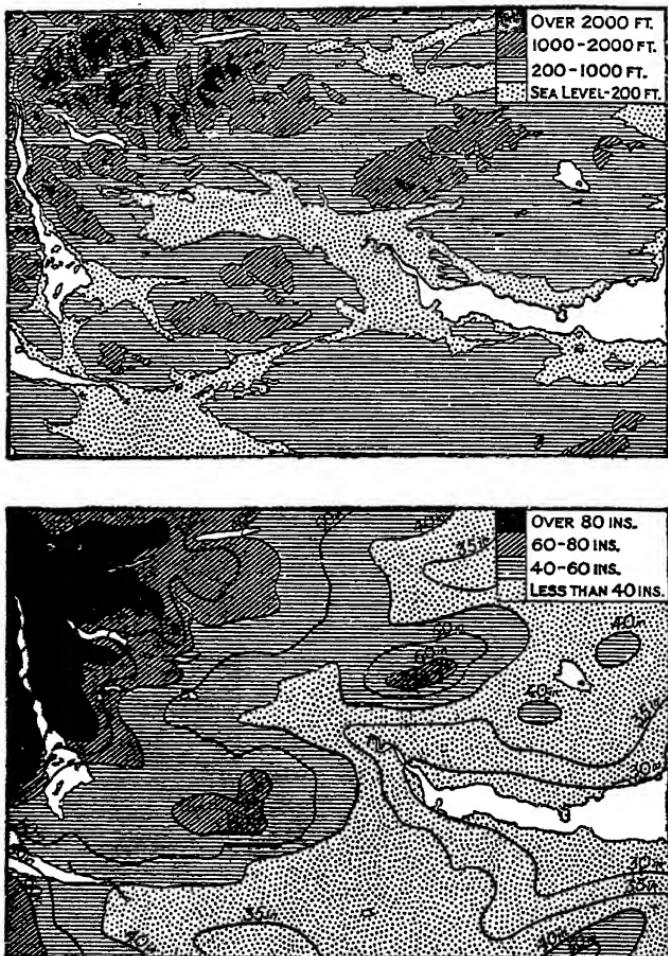


FIG. 85.—A rainfall map of the Midland Valley, with a physical map of the same area, to demonstrate the connection between the areas of high rainfall and the hills, and to show at the same time the gradual decrease in rainfall from west to east. (*After H. R. Mill.*)

marked than the northern belt and not very clearly separated from the Southern Uplands.

Very broadly, the western part of the Midland Valley is drained by the Clyde, which rises in the Southern Uplands, the eastern part by the Forth and its tributaries, which rise in the Highlands. By

no means the whole Midland Valley, however, lies in the basins of these two rivers. The north-east, including Strathmore, is drained by the lower Tay and its tributaries, the south-west by the Ayr and other rivers flowing directly to the sea.

Climatically the chief points to notice are that the west is con-

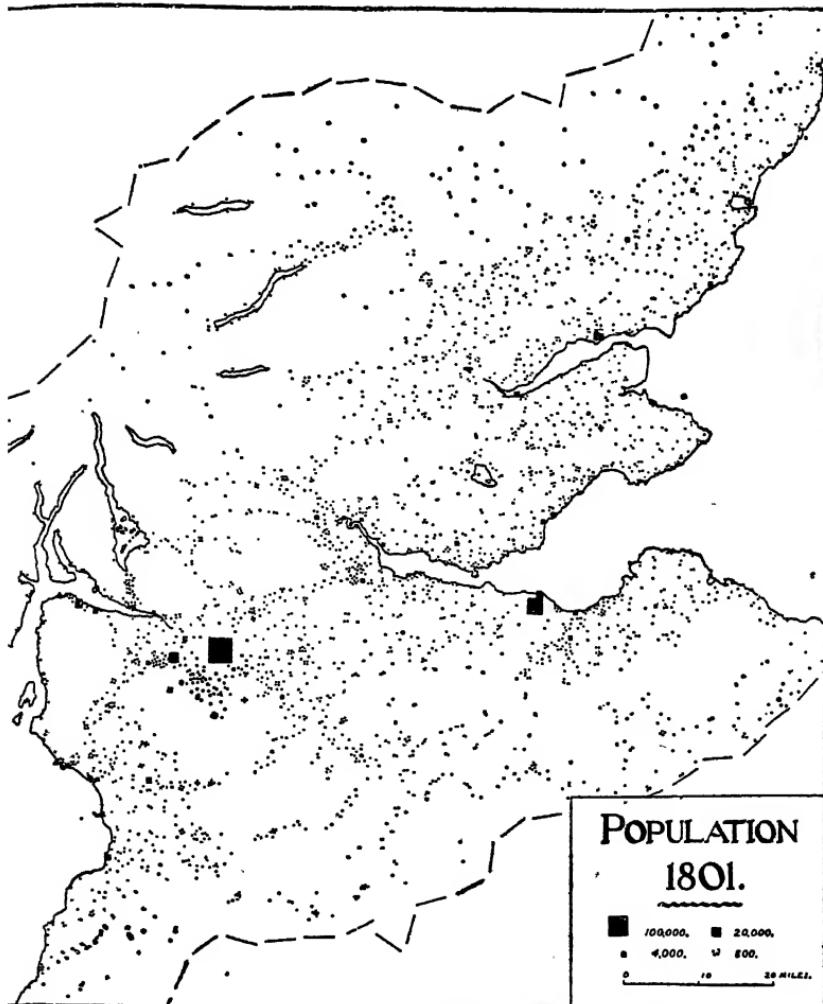


FIG. 86.—The population of the Midland Valley in 1801.

(From P. R. Crowe, *Scottish Geographical Magazine*, 1927.)

siderably damper than the east, and that the east in sheltered regions such as the Carse¹ of Gowrie behind Dundee, benefits from the generous amount of summer sunshine.

Because of recent years attention has been concentrated on the

¹ Carse = a level tract of alluvial land bordering an estuary, here the Tay estuary.
V.

industrial development of the Midland Valley, it is apt to be overlooked that this is, and always has been, the most important part of the country agriculturally. Owing to climatic differences there is a marked predominance of cattle-farming (with dairy-farming especially in Ayrshire) in the west, and of arable farming in the east.

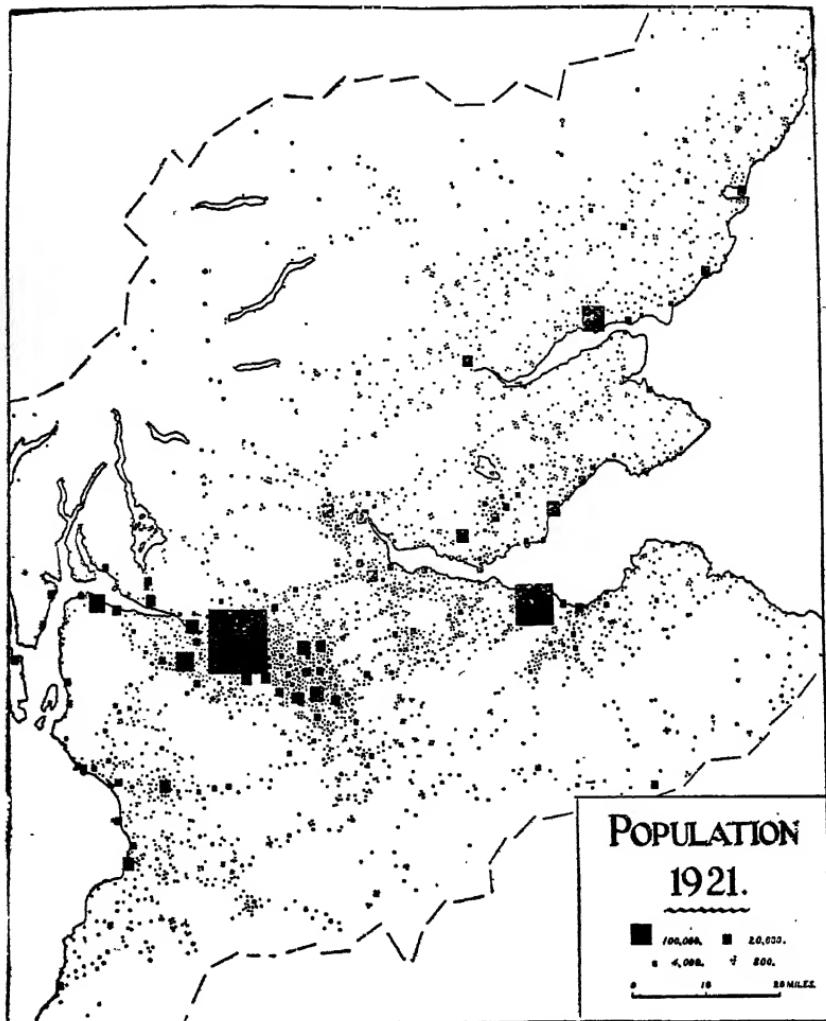


FIG. 87.—The population of the Midland Valley in 1921.

(From P. B. Crowe, *Scottish Geographical Magazine*, 1927.)

Wheat is comparatively unimportant owing to the northern latitude, but barley flourishes in the sunny east and oats over wider areas. The production of fruit, such as raspberries, in the east has given rise to the jam-making industry of Dundee, and affords an interesting example of the effect of climatic conditions. Sheep are

numerous on the upland areas—the hills of volcanic rock already mentioned being particularly interesting as affording little or no land suitable for tillage or for pasture grass for cattle, but supporting large numbers of sheep.

Although the population of Scotland has always been concentrated in the Midland Valley, in the Middle Ages it was the drier, more fertile lowlands of the east, facing the developed lands of the Baltic, which were of greatest significance, whilst the west remained almost a backwater. Two factors, in the main, altered this; one was the discovery of America, and the consequently heightened importance of the lower Clyde estuary; the other was the industrialization consequent on the development of the coalfields. The effect of the latter has been shown in two population maps.

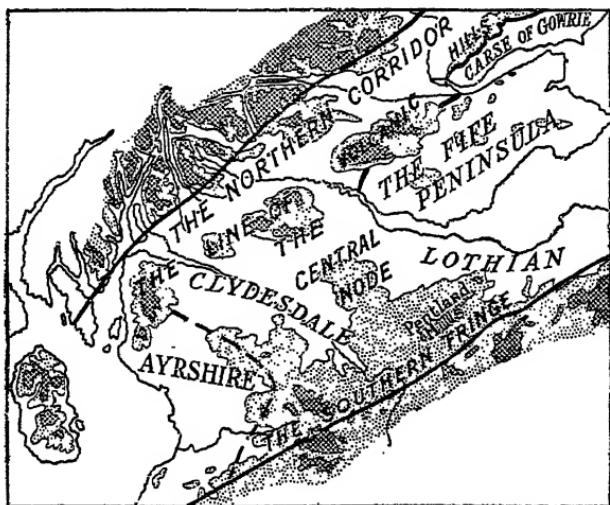


FIG. 88.—Sub-regions of the Midland Valley.

We are now in a position to consider, very briefly, the subdivisions of the Midland Valley, roughly indicated in Fig. 88.

(a) *The Northern Corridor, including Strathmore.*—This lies between the Highland margin and the line of volcanic hills—the Campsie, Ochils, and Sidlaws. Every six or eight miles there opens into this stretch of lowland a Highland glen affording access to the middle of the Highlands, whilst in the west the largest of Scotland's lochs, Loch Lomond, lies with its head in the highlands, but its broad foot in the lowlands. The lowland corridor reaches the east coast in the bay on which lies Stonehaven. The line of volcanic hills on the south of the corridor is conspicuously breached in two places—by the Forth, where the gap is guarded by the bridge town of Stirling; by the Tay, where the corresponding town is Perth. The scenery along the corridor itself varies; its most fertile part is in the east. Elsewhere the presence of stretches of moorland sheep

pasture, mixed with arable land and cattle pastures, give it a character intermediate between the Highlands and the lowlands proper.

(b) *The volcanic hills of the Ochils, Campsie, and Sidlaws.*—These are characterized by their usually very abrupt, often precipitous sides, by the covering of moorland serving as sheep pastures, and the almost complete absence of human population.

(c) *The Coast of the Firth of Tay and the Carse of Gowrie.*—This predominantly cultivated tract reaches its highest fertility in the Carse of Gowrie, with its far-famed high cereal yields, its bean crops and fruit orchards. Perth and Forfar link this area with Strathmore, but the great centre of the area—in the heart of it, but only partly “of” it—is Dundee. Dundee is the third city of Scotland, and the fifth port; its three characteristic industries—textiles, engineering, and jam-making—can be explained at least partly on a geographical basis. The demand for sailcloth, ropes, and fishing-nets along the coast led to the flax and hemp industries, the development of which was favoured by the situation of the town on the east coast facing Russia and the Baltic countries from which supplies of raw material could be drawn. The appreciation of jute as a possible substitute for flax and hemp, on the part of a Dundee manufacturer in a period of shortage of supplies of the latter, led to what is now the chief textile industry. Engineering is associated with textile machinery and with marine engineering; the jam-making industry with the local fruit supplies.

(d) *The Fife Peninsula.*—The description once applied to this area of “a beggar’s mantle fringed with gold” referred to the fringe of rich, cultivated land and the less fertile interior.¹ But the latter is now largely farmed, and the whole area must be re-oriented owing to the development of the coalfield. The Fifeshire coalfield yields nearly a quarter of Scotland’s annual production, and from the point of view of reserves occupies an even more significant position. Burntisland and Methil should be noted as coal ports, the chief industrial town is Kirkcaldy, with its linoleum factories. Dunfermline has an important linen industry and local skill in spinning and weaving has been an important factor in the recent introduction of the artificial silk industry.

(e) *Lothian.*—Facing the Fife Peninsula on the south side of the Forth estuary are lowlands divided into two halves, eastern and western, by the Pentland Hills. Between the tip of the Pentlands, however, and the sea lies Edinburgh, the proud capital of Scotland. To the east of the capital lies the Lothian coalfield, doubtless continuous under the Firth of Forth with the Fifeshire field; whilst to the west of the capital is the oil-shale region. Of the lowlands generally, however, prosperous mixed farming, broadly similar to that of Fifeshire, is characteristic.¹ The manufacturing industries of Edinburgh are numerous: engineering leads,

¹ For details see the Firth of Forth sheet of the Land Utilisation Survey.

but textiles, clothing, paper, wood, milling, and printing reflect the varied needs of the surrounding population. Milling reflects the imports of the port of Leith; the local barley is used in brewing and distilling; whilst printing and publishing are associated with the city as a university and educational centre.

(f) *The Central Node.*—The narrow “waist” of Scotland consists of a belt of lowland lying between the Firth of Forth on the east and the Clyde basin on the west. Like Fife and Lothian, into which it fades on the east, this is largely farming country, but the more westerly position is emphasized by the increasing importance of cattle, whilst more than half the whole is under grass. The mine workings of Clackmannan do not unduly obtrude themselves, but mention must be made of the important industrial area around Falkirk, one of the great iron-working districts. Falkirk lies in the Stirlingshire extension of the Lanarkshire coalfield and receives its pig iron from the Tees *via* Grangemouth, which port serves also as an eastern outlet of the Clyde area. The Clyde-Forth Canal terminates here, and it is one of Scotland’s great ambitions to replace this by a ship canal. The ancient port of Bo’ness serves the Clackmannan coalfield by shipping coal and importing pit props, and is also the port—a poor one, it is true—of West Lothian. The importance of the “central node” of Scotland becomes increasingly apparent when north-south routeways are studied. To pass by road from Edinburgh northwards it is still necessary to go westwards to the bridge town of Stirling, whilst the position of the battlefield of Bannockburn near Stirling emphasizes its ancient significance.

(g) *Clydesdale.*—Above Hamilton the Clyde valley is a rich and picturesque farming area. Above Crossford is the well-known gorge, and water-power has long been used to drive the cotton mills of New Lanark, and the falls have now been harnessed in the modern way to provide electric energy. Lanark is the county town of the rolling, cattle-rearing upland above the gorge, where arable farming is by no means insignificant.

Turning to the country around and below Hamilton, here is the great industrial region. The coalfield is worked mainly north-east of the Clyde itself, the iron and steel industry (now depending largely on imported ore) is concentrated in Airdrie, Coatbridge, Motherwell, and Wishaw; an area handling also brass and tin. Glasgow itself, with a population of well over a million, has a quarter of a million industrial workers. Engineering works, iron, steel, chemicals, and dyes lead, but the nearby Paisley is the home of the great cotton-thread works associated with the name of Coats. Below Glasgow, lining the banks of the artificially deepened Clyde, are the world-famous shipyards—the greatest shipbuilding area in the world. Glasgow is accessible to ocean liners, and in its *export* trade ranks

after London and Liverpool as the third port of Britain. Greenock, Gourock, and Port Glasgow are some of the Clydeside towns associated with the industry on the south bank; Dumbarton is noteworthy on the north. Glasgow's millions are, it may be noted in passing, exceptionally fortunate in having the Highlands at their door and some of the finest sea-loch scenery of Scotland within a day's pleasure cruise—a fact reflected in the many small seaside and tourist resorts in country otherwise economically unimportant.

(h) *Ayrshire*.—Ayrshire is a well-defined crescent of lowland surrounded by upland: a dairy county of rich grassland, sending its milk from the north to the towns of the Clyde, its butter and cheese from the more out-of-the-way south to the same area.

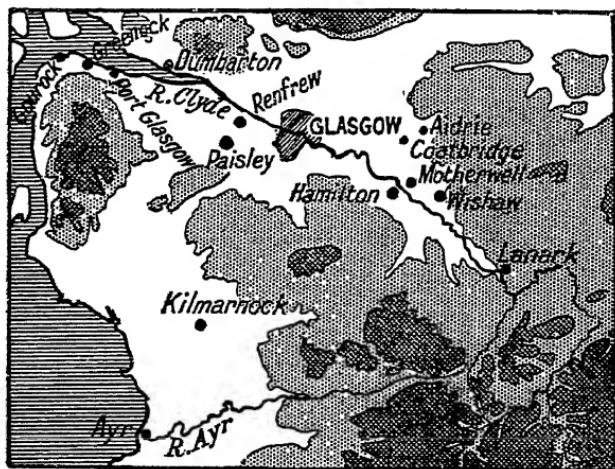


FIG. 89.—The Clyde Basin.

Land over 500 feet, lightly dotted; land over 1,000 feet, heavily dotted.

Except around Kilmarnock and Ardrossan one is apt to forget that there is an Ayrshire coalfield.

(g) *The South-eastern Fringe*.—Along the south of the Midland Valley of central Scotland there is nothing quite corresponding to the northern corridor. The valley fades rather imperceptibly into the country of the Southern Uplands, and the intermediate belt is one of mixed arable and cattle or sheep farming.

The Southern Uplands.—The Southern Uplands stretch right across southern Scotland from the North Channel to the North Sea. The old rocks have been folded into a great crumpled anticline, of which the northern "limb" has been cut off by the faults which bound central Scotland. But the northern boundary of the Southern Uplands, as already noted, is not as clearly defined as the southern boundary of the Highlands. The old rocks afford but a poor soil and the higher regions are clothed mainly with rough hill pastures, and the population consists chiefly of scattered sheep-

farmers. The granite masses which penetrate the sedimentary rocks of the western part of the Uplands likewise give rise to extensive moorland areas, but in the east, in the Tweed basin, are stretches of rock of carboniferous age which have weathered to tracts of considerable fertility. Indeed, much of the "Scott Country" is kindly farming land, with wide arable fields, rich pastures, and comparatively well wooded. Along the southern margin of the Uplands in the neighbourhood of Solway Firth is an extension of the rich Triassic plain of the Eden valley.

As in all parts of Britain, the west is wetter than the east, and

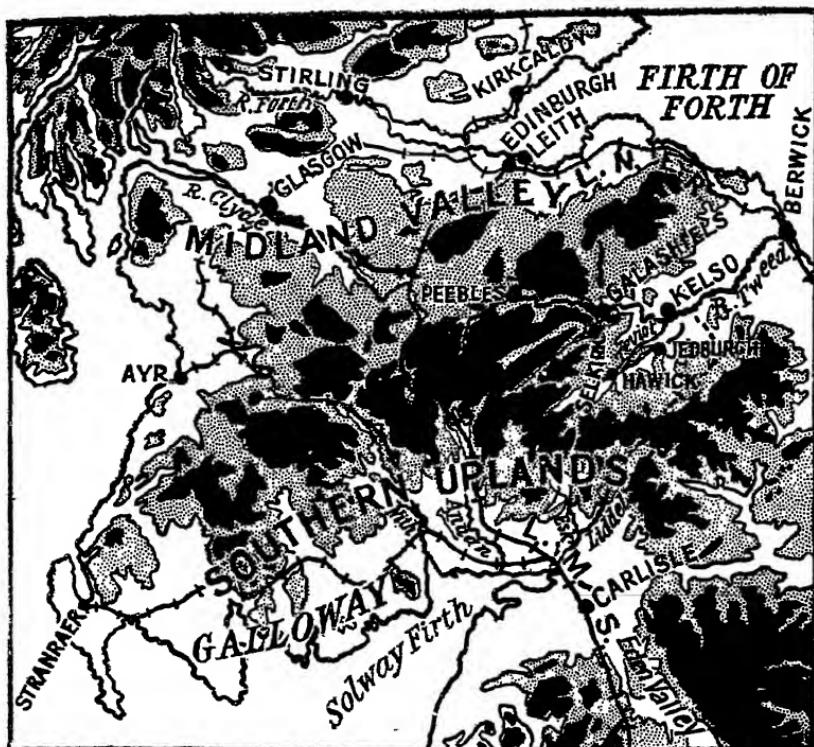


FIG. 90.—The Southern Uplands of Scotland.

Land over 500 feet, dotted; over 1,000 feet, black.

bordering the south-west coast in the region long known as "Galloway," whose valleys and lowlands support a prosperous dairy-farming industry. Indeed, Wigton is one of the leading dairying counties of Britain, and sends milk to such centres as Newcastle, Liverpool, and Birmingham. It is noticeable that the dairy farms have developed especially along modern lines of communication. The "short sea" route to Ireland from Stranraer to Larne has helped in the development of railways in this part of Scotland.

Further east is the well-known country of the dales. Nithsdale, Annandale, Eskdale, and Liddisdale present comparatively easy lines of communication between the plain of Carlisle and the industrial midlands of Scotland. The main L.M.S. line—the “West Coast Route”—to Scotland follows along Annandale; the line to Ayr goes along Nithsdale. The dales themselves are agrarian country from which penetration into the sheep pastures of the Uplands themselves is easy.

The eastern half of the Southern Uplands lies in the basin of the Tweed. The drier climate is to some extent responsible for making this the sheep-farming region of Scotland *par excellence*, and accounts for the textile industries of the small towns of the basin. Human-settlements follow along the deep, somewhat isolated valleys of Tweeddale, Ettrickdale, Teviotdale, and Lauderdale, and the main broader valley of the lower Tweed. The cottage woollen industry of the sixteenth to eighteenth centuries developed later into the factory industry of Hawick, Galashiels, Peebles, Selkirk, Jedburgh, and other towns. The specialization in woollens of high quality, including especially “tweeds” and hosiery, led to a world-wide demand, and necessitated the importation of foreign supplies of raw wool, on which the industry now largely depends. At the mouth of the Tweed stands the border town of Berwick, the natural port of the basin, and once the chief port of Scotland, but which was lost to England as early as 1482 and never again functioned as the main outlet of the area.

The Pennines.—The backbone of England has four vertebræ. In other words, the Pennine Range can be divided very clearly into four parts, or “massifs.”

(a) The northern block links the Pennines proper with the hill masses of the Cheviots and Southern Uplands and stretches as far south as the well-known Haltwhistle or Tyne Gap.

(b) The North Pennine massif is a roughly rectangular block stretching from the Tyne Gap in the north to the Stainmore Gap in the south. On the west it is bounded by a very abrupt, almost cliff-like scarp 1,500 to 2,000 feet high which overlooks the Eden Lowland, and is caused by the Pennine Faults. On the east the boundary is not so clear, and may be taken to lie where the Millstone Grits dip under the coal measures of the Durham coalfield—or more simply the western edge of the coalfield. The North Pennine massif is thus a great plateau block, largely more than 2,000 feet above sea-level, tilted to the east and drained by rivers which empty into the North Sea. It is built up for the most part of sandstones, with underlying limestones, belonging to the Carboniferous series.

(c) The next block of the massif is roughly the same size as the last, and stretches from the Stainmore Gap to the Aire Gap. It is

bounded on the west by a scarp caused by the Dent Faults and on the south by the Craven Faults. In this part of the Pennines limestone (Carboniferous Limestone) predominates, and there are large areas of barren "karst" country. In this limestone country much of the surface is covered with short grass very suitable for sheep-rearing. There are no coalfields on the flanks of this area; the Lake District lies to the west, north Yorkshire to the east.

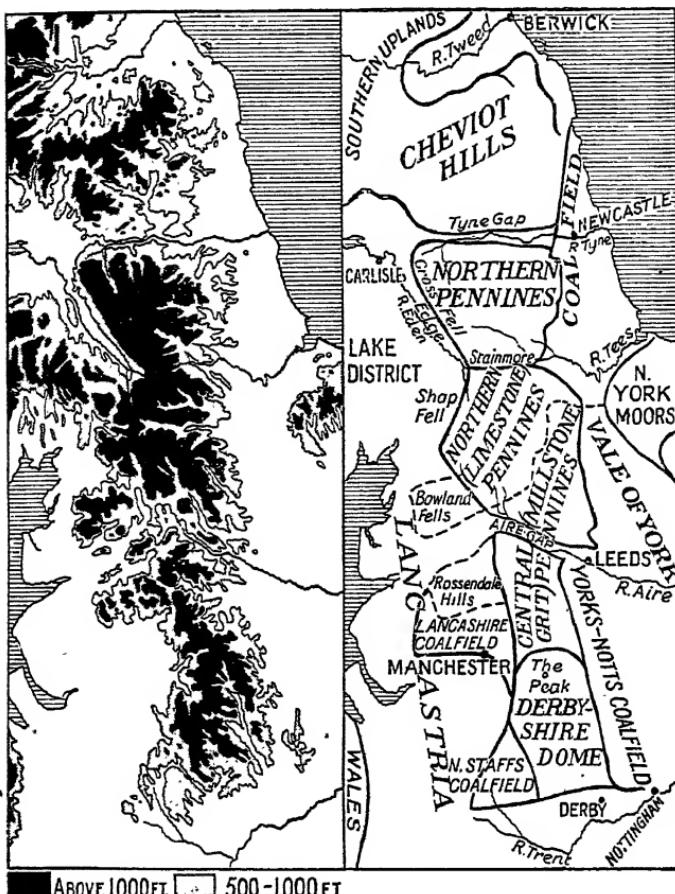


FIG. 91.—The Pennines.

(d) The South Central Pennines and Derbyshire Dome stretch from the Aire Gap to the Trent Valley near Derby, where the backbone of England may be said to end. The northern part of this area as far as the High Peak is Millstone Grit country—flat-topped hills covered with peat bogs and with heather-covered moorlands having poor, sour soil on the slopes. The hills are of little use to man in themselves, but afford a valuable gathering ground for pure

soft water which supplies the textile towns to east and south. South of the High Peak there is a central core of limestone, giving the country of beautiful wooded vales and grass-covered hills in the heart of Derbyshire. On either side is a strip of Millstone Grit moorland, and then the North Staffordshire coalfield on the west, the Yorkshire and Nottinghamshire coalfield on the east. The southern portion of the Pennines is much lower than the north, and large areas are below 1,000 feet.

As a whole, the Pennines have a good rainfall—in general more than 50 inches, but the elevation and character of the soil are against agriculture. The population is almost entirely limited to the dales, and even there one finds very little arable land, only grass. Grass-land, moorland, and hill pastures cover more than 95 per cent. of the whole area. On these rough pastures sheep and cattle are reared, the former ten times as numerous as the latter, but both reared mainly for meat. There are large areas of the lower slopes which might be forested, and a number of plantations have now been established. There are few towns really in the Pennines except such small "gap towns" as Settle and Skipton, and the inland watering places such as Matlock in Derbyshire.

Cumbria or the Lake District.—The Lake District lies in the counties of Cumberland and Westmorland and the northernmost part of the county of Lancashire. The Lake District proper occupies the central block of mountains, together with which area may be considered the surrounding lowlands. The Lake District is the northernmost of the three areas which form the upland areas of the west of England and Wales. The region as a whole is clearly defined. On the east there is the scarp which forms the northern Pennines and overlooks the valley of the Eden, and is one of the most clearly marked physical features in England. In the south-east the Lake District is linked with the Pennines by the Shap Fell group of hills. In the north Solway Firth penetrates so far inland as to almost reach the Pennines, and so forms a natural limit to Cumbria in this direction. On the south Morecambe Bay penetrates inland in the same way and performs the same function. On the west the limit of Cumbria is the seaboard of the Irish Sea.

Into the region so defined there are only four well-marked land routes. On the north the route lies between the head of Solway Firth and the Pennines and the great route town is Carlisle. Even at the present day the lowest road bridge over the Eden is at Carlisle, and the main west-coast railway, the London, Midland and Scottish line from London to Scotland, follows this old route. Another route converging on Carlisle is that from the east which crosses the Pennines by the Haltwhistle or Tyne Gap, and which is followed by the railway from Newcastle to Carlisle. A third route into Cumbria, also from the east of the Pennines, is that which

follows the Stainmore Gap into the south-eastern corner of the Eden valley. The fourth and last route is that which approaches from the south. Here Kendal occupies a position which corresponds approximately to that of Carlisle on the north, except for the fact that the main west-coast railway does not pass through it.

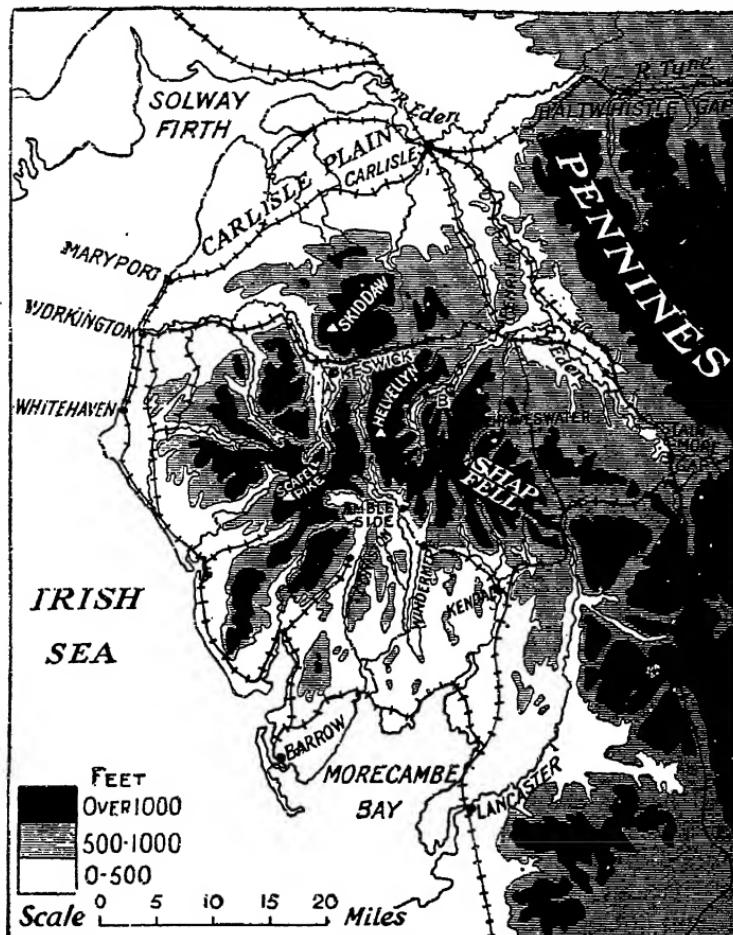


FIG. 92.—The Lake District.

Cumbria, as a whole, consists of several sub-regions :

- (a) The central Cumbrian dome ;
- (b) The Eden lowland ;
- (c) The Carlisle plain ;
- (d) The western coastal strip.

The Cumbrian Dome.—The central mass of mountains consists of ancient rocks, of hardened sediments, of metamorphic rocks with

thick flows of ancient lava—all of which are highly folded and penetrated by intrusive masses of granite. The whole has been covered by Carboniferous limestone and possibly by other rocks, even by chalk. Thus it would seem that the whole area was uplifted in the centre and the younger rocks worn entirely away, so that at the present time there is a mass of ancient rocks in the heart wrapped round by Carboniferous limestone, and to the north-west the whole is flanked by coal measures, forming the Cumberland coalfield. The uplifting of the mass in the centre seems to have given rise to the marked radial drainage. There are deep valleys, many of them occupied by the famous lakes such as Derwentwater, Windermere, Ullswater, etc., which radiate like the spokes of a wheel from a hub; the heart of the Lake District being in the neighbourhood of Helvellyn (3,118 feet). Scafell (3,210 feet) and Skiddaw (3,053 feet) lie really on the north and west respectively of the "hub."

The Eden Lowland.—This well-marked valley with an undulating floor is largely composed of younger Triassic rocks which have yielded a rich red soil. Thus it is an agricultural area strongly contrasted with the Lake District proper.

The Carlisle Plain.—This undulating lowland is similarly a fertile agricultural tract lying to the north of the ancient rocks, and including also some marine alluvium bordering Solway Firth.

The Western Coastal Strip.—This is comparatively narrow, except part in the north and south. In the northern part of it is the Cumberland coalfield; in the south are the iron ores around Barrow.

Iron, lead, and other minerals occur in the Lake District, but metalliferous mining is not now important. Of greater economic significance are the quarries for the beautiful Shap Granite and for road metal in various places. The famous iron ore of excellent quality was found formerly in pockets in the Carboniferous limestone of the south-west, but it is now largely exhausted. It gave rise to the iron and shipbuilding industry of Barrow, which is now, however, dependent mainly upon imported ores. The centres of the coalfield to the north-west are at Whitehaven, Workington, and Maryport. Many of the measures extend under the Irish Sea, and some of the workings are actually under the sea.

Climatically the mountain dome has a very heavy rainfall—Styhead, in Borrowdale, 150 inches per year, the highest recorded in England; but the Eden lowland lies in the rain shadow of the central dome and has only 30 or 40 inches, whilst the lowlands of the Carlisle Plain receive but little more.

The central part of the Lake District proper has an important tourist industry, and the proximity of the region to the industrial district of Lancashire should be noticed, for the Lake District forms a natural playground for these regions. The industry practically maintains such centres as Keswick and Ambleside. Agriculture is

the other principal occupation of Cumberland, but in the central dome it is almost limited to sheep farming. It should be noticed that with the increasing altitude the rainfall increases also. Any soils which originally existed were removed by the great Ice Age, when the Lake District was a centre of glaciation, and the central dome is largely barren. Above 1,800 feet there are a few rough hill pastures, but the principal hill pastures are from 900 to 1,800 feet above sea-level, and only a little oats can be grown here and there at this altitude ; in fact, cultivation is practically limited to the lower areas below 900 feet. In the heart of the dome there is very little land which can be cultivated, and less than two per cent. of the land is so used. Dairying is important in the broader lowlands which open out from the highlands. It should be noted that in the area of mountains the streams are not sufficiently large for the development of hydro-electric power, but there are important reservoirs for the water supply of certain great towns, notably Manchester. The lowlands of the Eden valley and the Carlisle Plain in contrast to the central mountains, have a rich red soil very suitable for cultivation, and on which large quantities of oats, swedes, and potatoes are grown. Even more important is dairy-farming, the milk being sent to Liverpool, Newcastle, and other urban centres in the north of England.

The Isle of Man.—Structurally the Isle of Man is most closely connected with Cumbria, with which it was formerly united. It consists in the main of a mass of old rocks with an area of Carboniferous limestone, like that of Cumberland, in the south, and a peninsula of younger red rocks in the north.

Mining was once important, and quarrying is still important. There are small manufactures of rope, nets, and woollen cloths, a few fishing vessels are built, and brewing is carried on ; but by far the most important occupation of the islanders is catering for summer visitors. Half a million visit the island annually, notably from Lancashire. Mountain, glen, and sea combine to make the scenery attractive ; centres such as Douglas, Ramsey, and Peel have urban attractions. Notwithstanding the mountainous area, well over half the surface of the island is cultivated, oats and turnips being leading crops, whilst dairying and market gardening (especially for summer visitors) are important.

Lancashire and Cheshire.—Between the Pennines and the Irish Sea, south of the Lake District, lies a broad lowland which occupies the greater part of the counties of Lancashire and Cheshire. The sea sends five fingers into the area, and cuts it up into several parts. The northern finger is Morecambe Bay, which separates Lancastria, as this region is often called, from the Lake District region. The second finger is the estuary of the Lune, dominated by Lancaster ; the third the estuary of the Ribble, with Preston ;

the fourth the estuary of the Mersey, dominated by Liverpool; the fifth the estuary of the Dee, leading to Chester. Although most of the area is lowland, there are two tracts of rough moorland. These

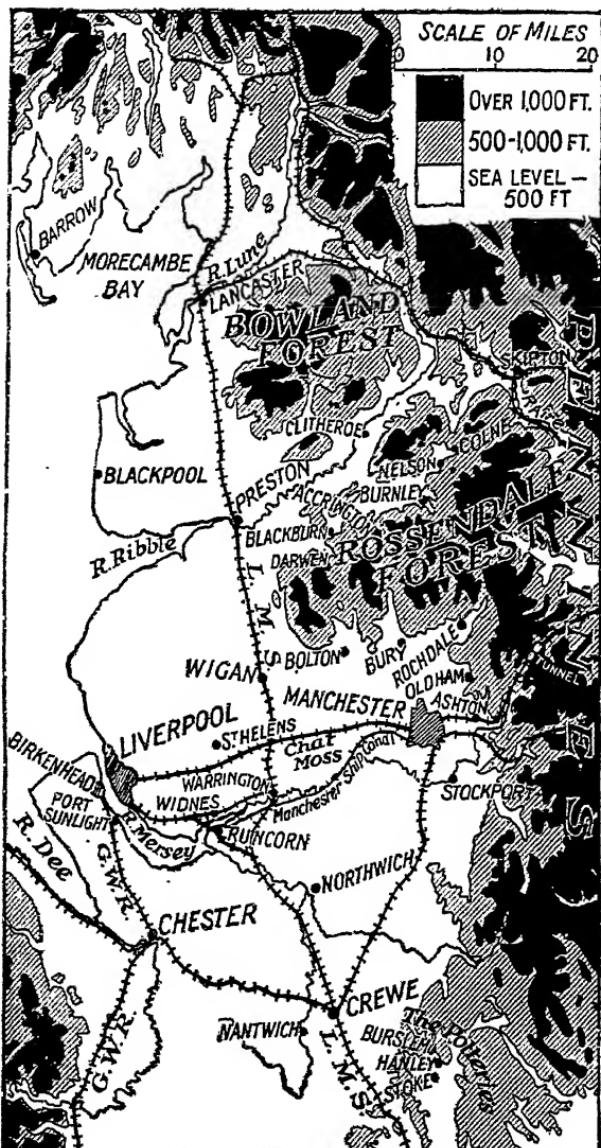


FIG. 93.—Lancastria.

are Bowland Forest, between the Lune and Ribble; Rossendale Forest, between the Ribble and Mersey. The limits of the area are clearly defined on the east by the edge of the Pennines (the "Lyme" preserved in such names as Newcastle-under-Lyme). In the south

the region extends as far as the Midland Gap, where the uplands of Shropshire approach the south-western corner of the Pennines.

Except for the two upland areas just mentioned, Lancastria is occupied mainly by stretches of Triassic sandstone and marl, like those of the Eden Valley and the Midlands, much of which weathers to a fine rich red soil. Although we always think of Lancastria as a great industrial region, outside the urban centres west Lancashire and Cheshire are rich agricultural lands. The great crops are potatoes and oats, but grasses are usually sown one year in three or two years in four, and very large areas are under permanent grass. The moist climate favours cattle, and Cheshire is perhaps the most important dairying county in all England. In addition to these fertile tracts, large areas of Lancashire are occupied by poor sandy tracts, where the soils are glacial sands or sands derived from the millstone grit and other rocks.

But the great importance of Lancastria is as an industrial region, associated primarily with cotton spinning and weaving. Mention has been made above of the five rivers which penetrate the plains of Lancastria; the industrial centres may be considered in relation to them.

(a) *Lancaster and the Lune Valley.*

The once important Roman military station of Lancaster is now of small importance compared with the great towns of south Lancashire. It remains an important route town through which pass the main west-coast routes to the north, but the Lune is too shallow to admit large vessels, and Lancaster has only small manufactures of linoleum and oilcloth.

(b) *Preston and the Ribble Basin.*

Not only is Preston itself a much more important centre than Lancaster, but in the Ribble Basin lie all the larger weaving centres of Lancashire. The northernmost town is Clitheroe, actually on the Ribble; to the south are the larger centres of Burnley and Blackburn, both of which have specialized in the past in the cheaper cotton cloths for export. Other centres are Accrington and Darwen. The Ribble valley affords communication with the Yorkshire woollen region via the Aire Gap, hence it is not surprising to find woollens as well as cottons manufactured at Nelson and Colne. The growing importance of artificial silk in many towns should be noted. Preston is the great market, administrative and route centre, but is only of minor importance as a port. The position of Blackpool, Lancashire's seaside recreation ground, should be noted.

(c) *Liverpool and the Lower Mersey.*

A description has already been given of the position and importance of Liverpool—with which is included Birkenhead on the opposite side of the estuary. Docks occupy its water front; its industries are in the background, but a list of them shows the close

connection with Liverpool as an importing centre, since they include flour milling (of imported grain), sugar refining, oil extraction, soap and margarine manufacturing, as well as the manufacture of foods of varied character, ship repairing, shipbuilding, and engineering. Although the bottle-shaped estuary of the Mersey has a tidal current which has been of great value, in its early days Liverpool was hampered by sandbanks at the mouth, a difficult channel, and an absence of communications with the interior. The story of Stephenson's railway across the boggy land known as Chat Moss illustrates sufficiently the difficulty of linking Liverpool even with Manchester

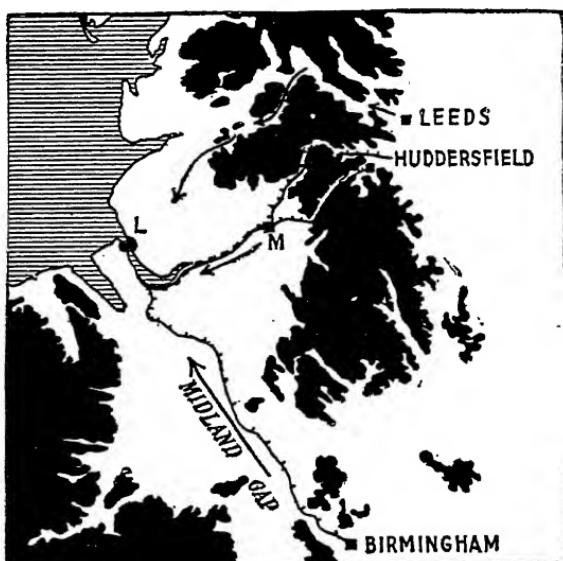


FIG. 94.—Map showing the position of Liverpool.
Land over 500 feet, black.

Details will be found in the Liverpool sheet, Land Utilisation Survey.

in the early days of its growth, and it is due to the activities of man that the difficulties have been gradually overcome.

(d) *Runcorn, Widnes, Warrington, and the Middle Mersey.*

The industrial region of the Middle Mersey owes its origin primarily to the Cheshire saltfield, which stretches almost as far north as the Middle Mersey. Sandbach, Middlewich, Winsford, Northwich and near Runcorn are the chief centres, but the salt is now obtained by pumping water into the "mines" and pumping it out as brine. The abundance of salt led to the establishment of a great chemical industry, whilst the Manchester Ship Canal has much to do with the rise of Runcorn and Widnes as its chief centres. This area supplies the chemicals needed for the glass manufacture at St. Helens to the north, and for the soap factories of Port Sunlight (near Liverpool), Warrington, and Widnes.

(e) *Manchester, the Upper Mersey, and South-east Lancashire.*

The great manufacturing region of south-east Lancashire centres on Manchester, and though there are few cotton mills in Manchester



FIG. 95.—The Manchester Ship Canal.

itself, which is the business centre and now an important port, over 80 per cent. of the cotton spinning is carried out within 18 miles of the heart of the city. The great spinning towns of Bolton, Bury, Rochdale, Oldham, Ashton, and Stockport lie grouped round Manchester, the northern ones on the Lancashire coalfield. The specialization characteristic of the industry is seen even among these towns : Bolton concentrates on finer cottons, Oldham on medium. The coalfield town of Wigan, an important centre for the manufacture of cotton-mill machinery, lies to the north-west and beyond the confines of the Mersey Basin.

(f) *Chester and the Dee Basin.*

The old Roman town of Chester no longer functions as a port, but smelting works for iron and lead, as well as artificial silk factories, exist along the Dee estuary, and the region may one day develop as a large industrial area.

(g) *The Potteries.*

The Potteries or North Staffordshire coalfield region lies to the south-east of Lancashire and on the south-west flank of the Pennines

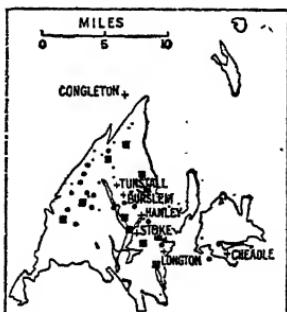


FIG. 96.—The Potteries coalfield.

For an explanation of the signs used, see Fig. 55.

The coalfield is often considered as one of the coalfields of the Midlands, and will be mentioned again in this connection.

Northumbria.—Having considered the two natural regions of Cumbria and Lancastria, which lie to the west of the Pennines, we turn to those on the east. In the north, occupying most of Northumberland and Durham, and of which the industrial life centres on the valleys of the Tyne, Wear, and Tees, is a region which may be called Northumbria.

Northumbria, or North-East England, is bounded on the west by the Pennines, but the boundary is ill-defined, and is best taken where the moors of the Pennines replace the fields and pastures of the lower ground. The northern limit is well defined, for the Cheviots approach closely to the coast near Holy Isle and separate Northumbria from the Tweed Basin; whilst on the south the natural limit is formed by the Cleveland Hills. The well-known Northallerton Gap is the only break in the girdle of hills which shuts in Northumbria. Carboniferous rocks cover most of the region, and over large areas yield but a poor soil; agriculturally the younger soils of the lower Tees Basin afford the best soils, and this region is of importance in supplying agricultural, and especially dairy, produce to the industrial centres.

The industrial development has been based on the exploitation of the coalfield, which resembles that of Cumberland, but differs from most of the English coalfields in being situated along the seaboard. Since the early days of mining much of the coal has been exported. At the present time half the output is exported—the field supplying two-thirds of the coal exported from Britain—and in addition much of the coal is sent by sea to London and the south coast. The shipbuilding industry owes its early growth to the need for ships for the shipment of coal, the iron and steel industry to the early utilization of local “blackband” iron ores. Northumbria benefited greatly from the great railway development of the middle of last century. To this day it remains a leading railway engineering region.

(a) *Tyneside.*

The Tyneside industrial region consists of a series of towns with a total population of a million, strung out along both banks of the lower Tyne for about 15 miles from the mouth. Newcastle is the focus, facing it is Gateshead; Tynemouth and North Shields lie to the north of the Tyne mouth, South Shields to the south. Other towns are Wallsend and Tyne Dock. The Tyneside rivals the Clyde as a centre of Britain's shipbuilding industry; the local iron and steel works supply the shipbuilding yards and engineering workshops. Cheap coal and waste gas from the iron furnaces led to the development of glass and chemical works, whilst the smelting of lead has long been important.

(b) *The Wear.*

It has not been possible to dredge the Wear as the Tyne has been dredged, and so industrial development is concentrated in

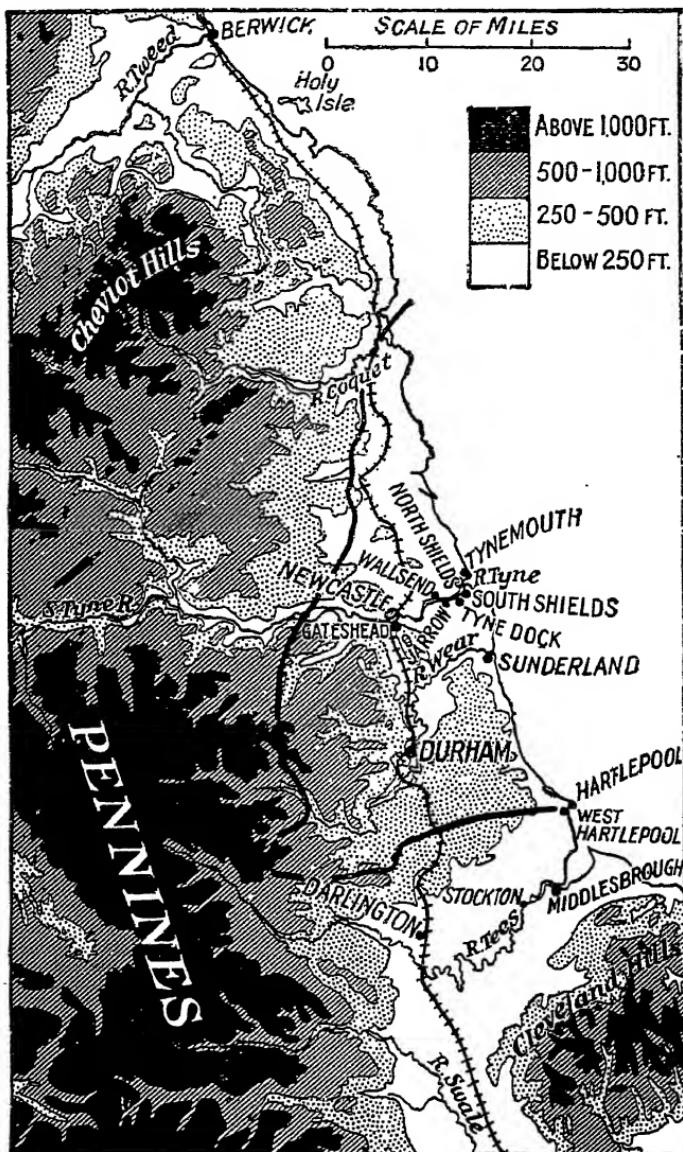


FIG. 97.—Northumbria.

The heavy line shows the limits of the coalfield. The small gap in the south (by the River Swale) is the Northallerton Gap.

Sunderland, which has an active coal export trade and imports mine-timbers and also builds cargo-vessels. Durham on the Wear lies in the south of the coalfield.

(c) *Tees-side.*

Tees-side lies to the south of the coalfield, and its development as an industrial region only dates back a hundred years. Stockton and Middlesbrough developed as coal-exporting ports and had a small import of iron ore, but it was not till the 'seventies of last century that Middlesbrough utilized the nearby Cleveland ores and developed so rapidly that to-day the region, using both Cleveland and imported ores, produces a quarter to a third of the iron made in this country. Various iron-using industries have developed; the slag is utilized as road metal, whilst the discovery of salt in the rocks north of the Tees has led to a rapid development of chemical manufactures at Stockton, the Hartlepoools, and notably at Billingham.

The Vale of Tees with its richer red soils, derived from Triassic rocks, is a rich agricultural region, in many ways complementary to the industrial regions farther north; but in the midst of this area lies Darlington, for the last hundred years associated with railway engineering and bridge-building.

The Yorkshire Regions.—The country lying east of the Pennines and stretching to the North Sea, and comprising most of Yorkshire with adjoining parts of Nottinghamshire and Derby, does not form a single natural region as does Lancashire to the west of the Pennines. Actually there are at least six regions.

(a) The Yorkshire-Nottinghamshire Coalfield,¹ with the great woollen districts in the north and the Sheffield iron district in the south.

(b) The level, fertile Vale of York.

(c) The North York Moors, including the Cleveland Hills.

(d) The Vale of Pickering.

(e) The York Wolds.

(f) Holderness and the Humber Region.

The relationship of these regions is roughly shown in Fig. 98.

(a) *The Yorkshire-Nottinghamshire Coalfield.*

On the eastern flanks of the southern Pennines lies the greatest coalfield in Britain, extending for over 70 miles from north to south, from the Aire Valley to the Trent lowland. On the west and north the field is bounded by the older Millstone Grit of the Pennines; to the east the coal measures dip under newer rocks, and the "hidden coalfield" of the east forms a very important part of the whole. Though the coal measures are continuous from north to south, industrial development has distinguished three areas.

¹ The country north of the coalfield lying on the slopes of the Pennines has already been considered as part of the Pennines. The famous "Yorkshire Dales" lie in this area. From north to south the rivers are the Swale, Ure, Nidd, Wharfe, whilst through the coalfield flow the Aire-Calder and Don. Notice the initial letters make the word SUNWAD.

In the north is the "West Yorkshire Coalfield" and the great woollen district. The woollen towns are nearly all in the valleys of the Aire and Calder. Leeds lies where the Aire valley opens out on to the plains and is the focus of the whole district. In the same way as Manchester is the focus of the cotton-spinning district of Lancashire, yet itself plays an unimportant part in the actual spinning, so Leeds is not primarily a woollen town, but is engaged in the work of distribution, in engineering, and the making of clothes.

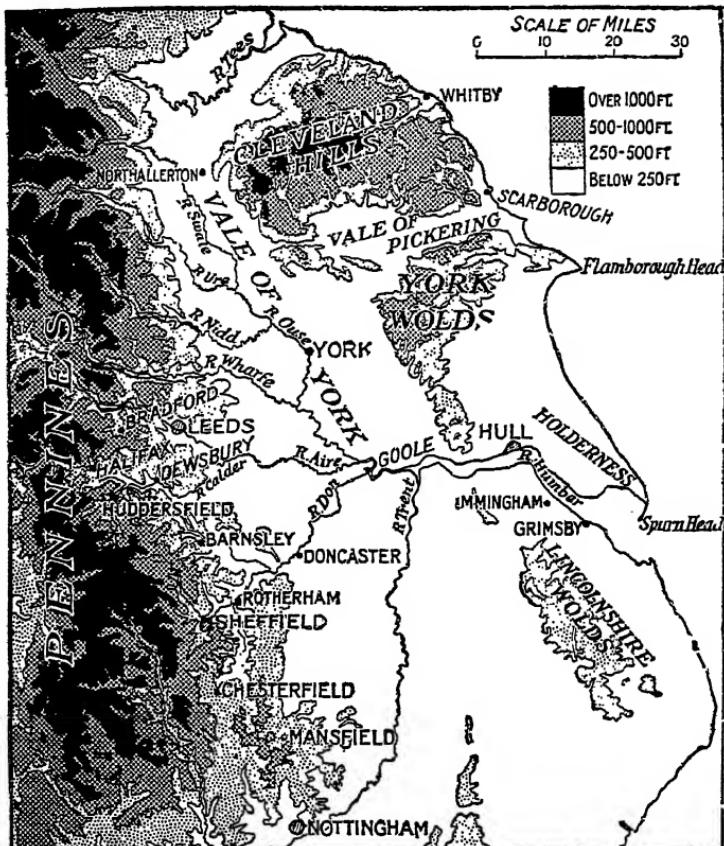


FIG. 98.—Natural Regions of Yorkshire.

Bradford is the centre of wool-combing and worsted; Halifax makes carpets and heavy woollens; Huddersfield specializes in fine cloths; Dewsbury in "shoddy." The early rise of the woollen industry in Yorkshire was determined very largely by the suitability of the lime-free waters from the Millstone Grit (*not* from the limestone areas of the Pennines) for scouring and dyeing.

Further south is the "South Yorkshire Coalfield" with its focus at Sheffield. Iron smelting from local ores was carried on from an

early date Water-power from the Pennine streams and hard sandstones suitable for grindstones encouraged the cutlery trade. Gradually there was a concentration of the iron and steel works in Sheffield itself, which led to the world-famous cutlery industry, now dependent entirely on foreign iron ores. This is despite the fact that Sheffield does not lie on any well-marked natural route-way. Other iron centres are Rotherham, Doncaster, Barnsley (textile machinery), and Chesterfield. The concealed coalfield has been proved roughly as far east as the Trent, and recent development has been specially in the Doncaster area.

The southern part of the coalfield, lying mainly in Nottinghamshire, has not given rise to the same degree of industrialism. An important centre is Mansfield, whilst Nottingham, with its lace, hosiery, and leather industries, lies just at the southern end of the coalfield in the Trent valley.

(b) *The Vale of York.*

The heart of Yorkshire is occupied by a great plain stretching for 60 miles from north to south and occupying on the south a width of 30 miles between the foothills of the Pennines on the west and the scarps of the Jurassic rocks on the east. On the north it narrows to 10 miles in the Northallerton Gap, leading to the Tees Basin, on the south it stretches to the marshes which once bounded the Humber. The soils are mainly glacial and alluvial—there are stretches of light sands alternating with glacial clays; but the ancient marshes have been drained and the extensive flooding of rivers prevented. As a whole the Vale of York is a fertile agricultural region, with a rainfall of 25 to 30 inches. It is the northernmost area where wheat is an important crop, and there are numbers of small agricultural villages, but the centre of the region and its great market town is York. For more than a thousand years before the Industrial Revolution York was the largest town in the North of England. It lies at the crossing place of the north-south waterway of the River Ouse, which was navigable by small sea-boats as far as York, by an east and west roadway formed by a low, sandy ridge. It was the first site up the river where there was land sufficiently above flood level for a town to be built, and hence the Romans established here their military capital of Britain (Eboracum). It remains the ecclesiastical capital of northern England, though smaller than half a dozen of the industrial towns of Yorkshire.

South of the Humber the Vale of York merges into the level agricultural lands of the Isle of Axholme, and then into the Triassic plain of Nottinghamshire.

(c) *The North York Moors.*

Properly speaking, the North York Moors form the northernmost portion of the Jurassic scarplands of south-eastern England. The dip of the rocks is very slight, so that the region may be described

as a flat-topped plateau of Jurassic rocks. Where the harder stone beds which form the surface layers have been cut through, steep-sided valleys are formed and are very characteristic. The scarps are particularly well marked on the north and north-east. One of the hard bands is the famous Cleveland iron ore which is mined chiefly in the northern part of the hills and sent almost entirely to the Teeside region. The well-known seaside resorts of Whitby and Scarborough lie on the coast of north Yorkshire.

(d) *The Vale of Pickering.*

This small but well marked region was once the bed of a glacial lake. Most of the oval region is now well drained and occupied by rich arable land with a black soil like that of Fenland. The villages are found on the drier margins of the old lake basin.

(e) *The Yorkshire Wolds.*

Just as the North York Moors are the northernmost part of the Jurassic scarplands, so the Yorkshire Wolds form the northernmost extension of the chalk ridge. The country resembles the Lincolnshire Wolds. Until about 150 years ago the whole was devoted to sheep, but now turnips, clover, barley, and wheat are grown.

(f) *Holderness and the Humber.*

Holderness is a low-lying peninsula covered with glacial deposits. All the old swamps and marshes have now been drained and nearly the whole peninsula is cultivated. Wheat is the chief crop; barley and other crops are also grown. The region may be regarded as the northernmost portion of the rich cornlands of eastern England. The North Sea has worn away large areas of land between Flamborough Head and Spurn Head, but in the mouth of the Humber much land has been regained from the sea. In great contrast to the rural country of Holderness is the great port of Hull. Hull is essentially the eastern gateway to the industrial regions of Northern England, but the surrounding country has not been industrialized as in the case of Liverpool. Hull grew up as a port of trans-shipment between river and sea-borne traffic, and the inland waterways of its hinterland are still of considerable importance. Hull, though the third port of Britain, has not the monopoly of the Humber trade; Goole is accessible to small steamers, and on the south side of the estuary are the great fishing port of Grimsby and also Immingham, which is the creation of the railways.

Wales.—Geographically Wales is essentially the hill country to the west of the English Midlands. The greater part lies at an elevation of more than 600 feet above sea-level, a few peaks rise to over 3,000 feet, including Snowdon (3,560 feet), and Carnedd (3,464 feet), but others are rather lower, including Plynlimmon (2,488 feet), and Cader Idris (2,927 feet). North Wales and much of Central Wales consist of ancient sedimentary rocks resembling in age and character those of the Southern Uplands of Scotland and the Lake

District. There are also, notably in Anglesey, tracts of still older rocks resembling those of the Scottish Highlands, whilst many of the higher peaks in Wales are built up of ancient volcanic rocks. South Wales consists essentially of a great basin of Carboniferous rocks, the coal measures of the South Wales Coalfield occupying the centre. The basin is elongated from east to west. In the eastern part of Central Wales, between the coalfield and the North Wales mountains, is a broad area occupied by Old Red Sandstone. Part

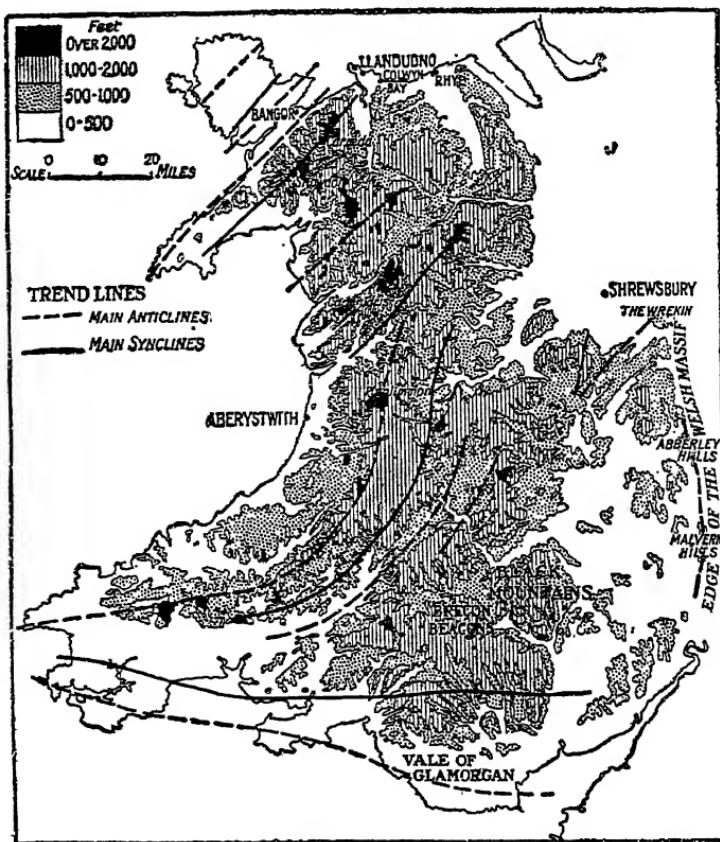


FIG. 99.—Physical map of Wales showing trend lines.

of this forms one of the wildest and most desolate upland areas in Britain—the Brecon Beacons and Black Mountains; but the eastern part, ranging into Herefordshire, is smiling orchard country celebrated for its apples. There is a small fragment of South Wales, called the Vale of Glamorgan, which is quite different from the rest of the country, and really belongs to the agricultural region of the south-east of England.

Like the other highland areas of the British Isles, Wales is a

gion of heavy rainfall. It lies, however, on the warmer western side of Britain, and despite the height of the mountains snow does not lie for long, whilst the valleys of the west coast are sheltered from the cold east winds and enjoy a very mild climate.

Wales has never been thickly populated; the lowland margins on the west attracted immigrants by sea, the lowland margins on the east invaders by land. The broken-up nature of the country prevented outside influences from dominating the whole; hence the Welsh language and an intense national feeling have persisted to

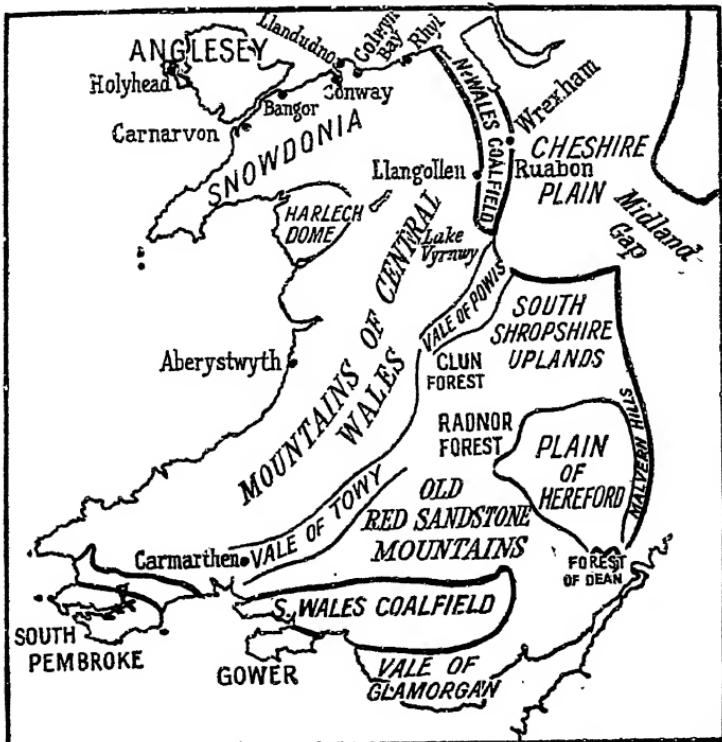


FIG. 100.—Map of Wales showing regions.

his day—in contrast to Cornubia, where the Cornish language has entirely disappeared.

Before the Industrial Revolution Wales was essentially an agricultural country. Sheep farming and, secondly, cattle rearing were the leading occupations; small quantities of oats and other crops were grown; and the life of the community centred on the market towns. Owing to the dissected nature of the country these market towns were very separated from one another. There were numerous little ports round the coasts, and where small deposits of copper or lead existed each little valley was able to supply its own

needs of these metals. Traces of the comparative isolation of the market towns or urban centres of Wales remain to this day: the National Museum of Wales is at Cardiff, but the National Library at Aberystwyth; the colleges of the University of Wales are scattered at Cardiff, Swansea, Aberystwyth, and Bangor, but the most convenient meeting place is at Shrewsbury—outside Wales altogether.

With the coming of railways and the development of the coal-fields the isolation of Wales was broken up. There has been a drift of population to the south, whilst that of the purely rural parts has remained stationary. The little local industries, including nearly all metal mining, have been killed by outside competition. Only such industries as could be organized on a large scale—such as the extraction of slates in the Festiniog area of the Snowdon Range—were able to persist.

Wales may be divided into a number of geographical sub-regions, and a broad but convenient division is shown in Fig. 100.

(a) *Anglesey*.—Although Anglesey is largely built up of some of the most ancient metamorphic rocks in Britain, the surface of the island has been planed down to a low, gently undulating plain which contrasts curiously with the majestic mountain tract of Snowdonia on the mainland. The island is almost devoid of trees, pasture land is more important than arable, and considerable tracts are ill-drained and marshy. Holyhead is the packet station on the Royal Mail route to Dublin. The Menai Strait is crossed both by road and rail bridges.

(b) *North and Central Wales*.—The rocks of North Wales were folded by the same earth-movements as those which affected Scotland and the Lake District, so that the features have, on the whole, the same Caledonian trend from north-east to south-west. North Wales was greatly influenced by ice action—it has long, straight, V-shaped valleys without spurs, and numerous little glacial lakes. Among the latter are numerous "corrie" lakes, which occupy little basins high up the mountain sides and from which the glaciers of old took their rise. Reference has already been made to the small and often decreasing agricultural population of North and Central Wales, and the special interest of such little market towns as Newtown (Montgomeryshire). With modern road development and motor transport, North Wales has been thrown within easy "week-end" distance of Lancashire and the north. Snowdonia is visited in the summer by thousands of tourists: all along the north coast are seaside resorts patronized by visitors, especially from northern England. Such towns include Llandudno, Rhyl, and Colwyn Bay, whilst Carnarvon, Conway, and Harlech are visited because of their historic interest. Bangor and Aberystwyth are also educational centres. Some of the power resources of North

Vales have been developed, notably near Snowdon; whilst the mountains of North and Central Wales supply water to such Midland towns as Birmingham (from Lake Vyrnwy).

(c) *The North Wales Coalfield.*—Lying on the borders of the Welsh mountains and the Cheshire plain, this region is of the plain rather than of the mountains. In the same area is the interesting Llanollen district. Ruabon and Wrexham are the two coalfield centres.

(d) *The Old Red Sandstone Mountains.*—This triangle of wild country, which includes Mynydd Epynt, Brecon Beacons, and the Black Mountains, is remarkable for its wide stretches of utterly desolate moorland. The area merges on the south into the coalfield, but on the north is bordered by the broad *Towy Valley*, which separates it from the mountains of Central Wales. This valley merges westwards into the dairying country of Carmarthen and Pembrokeshire.

(e) *The South Wales Coalfield.*—Physically the South Wales coalfield coincides roughly with an elevated plateau deeply gashed

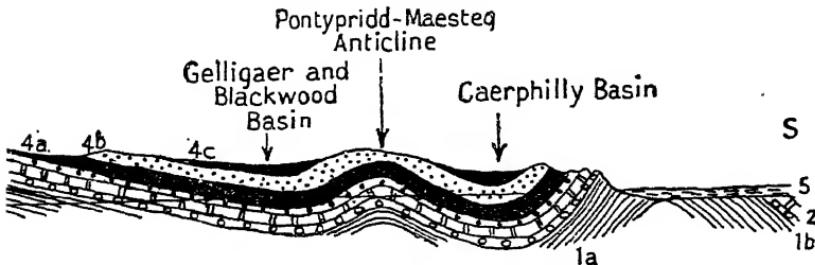


FIG. 101.—Section across the South Wales Coalfield from north to south.

- * 1. Old Red Sandstone marls; 1b. Old Red Sandstone conglomerates; 2. Carboniferous limestone; 3. Millstone grit; 4a. Lower coal series; 4b. Pennant grit; 4c. Upper coal series.

with narrow valleys and extending northwards beyond the limits of the coalfield itself into Central Wales. The coalfield of South Wales may be likened to an elongated and irregular pie-dish, the "rim" of the coalfield corresponding with the rim of the pie-dish, whilst inside have been deposited two series of coal-bearing rocks, separated by a considerable thickness of barren sandstone (the Pennant Grit). The centre of the basin has been brought nearer the surface by a subsidiary fold, so that from north to south a typical section across the field appears as in Fig. 101. The upper coal-bearing series is limited in its distribution; the lower is exposed round the edge of the basin and in the valleys. The highest land in South Wales is formed by the Old Red Sandstone to the northeast of the coalfield, but it is the presence of the hard Pennant Grit which is the reason for the wide stretches of high moorland country so characteristic of the coalfield. In extent from north to south the coalfield narrows westwards, and is cut into two unequal portions

by Carmarthen Bay, the small Pembrokeshire field lying to the west. The main coal basin is crossed by a succession of faults which have a trend from N.N.W. to S.S.E. The natural drainage being from the high ground further north, river action has scooped out deep valleys along these fault lines, and so one gets a picture of a high moorland country gashed by deep, narrow valleys whose outlet is south-eastwards. It is actually the outlet of these valleys which has determined the site of Cardiff and Newport. Other faults, though less numerous, cross the set already mentioned approximately at right angles, and at least one very important valley—the Vale of Neath—has this trend, and affords access from the heart of the coalfield to the coast at Neath and Swansea.

Before the days of the Industrial Revolution the moorlands were tenanted by a few sheep, woodland clothed many of the valleys, and the whole area was very thinly populated. The coal-measure iron ores were worked before the coal became important, and were smelted with local charcoal—one reason for the almost complete absence of forests at the present day. The iron industry developed rapidly with the growth of coal mining : rich haematite ores occurring as pockets in the limestone rim of the field were utilized as well as the clay ironstones of the coal measures. The industry expanded rapidly in the eighteenth century, and gradually became concentrated on the coalfield. With the exhaustion of local ores and the substitution of imported ores the industry shifted largely to the coast, so that now the leading centres are the coastal centres at Llanelli, Port Talbot, Cardiff, and Swansea.

Although South Wales shares with other parts of Britain its iron and steel industry, the Swansea-Llanelli area has a virtual monopoly in the manufacture of tin-plate. The tin for coating the thin iron sheets is imported mainly from Malaya—to the extent of 15,000 tons annually—and this represents the bulk of the tin imported into Britain. The manufacture of sheets galvanized with zinc (corrugated iron) is carried on in the same mills.

A still older industry in South Wales is copper smelting. Originally the ore came from Cornwall, where little charcoal was available for smelting, and was brought to Neath. Later foreign ores were used ; but now only copper refining is carried on. Lead smelting has largely replaced copper smelting, and nickel refining is also an important industry near Swansea. A chemical industry has arisen to deal with by-products and to supply acid for tin-plating.

But the greatest industry is coal-mining, involving an output of, normally, between 34 and 50 million tons per year. The special character of the coal trade is due to two factors—the variety of coal and the geographical features affecting communications. Anthracite occurs in Pembrokeshire and the north-west ; household coals

in the centre; steam coals, suitable for bunkering ships, especially

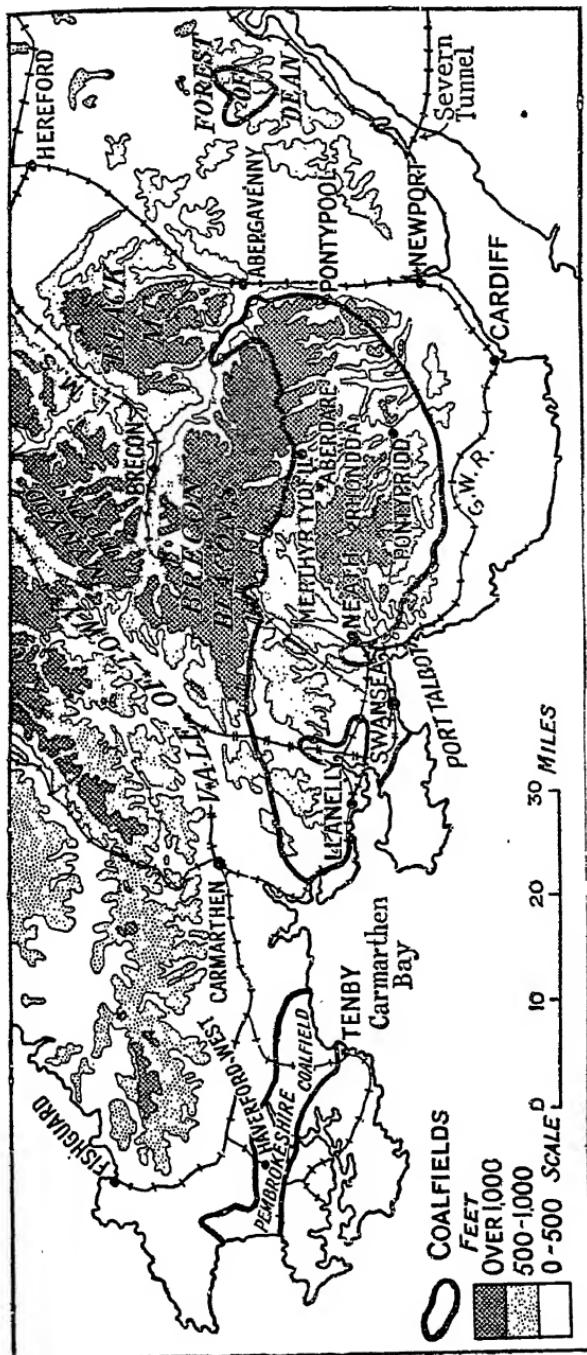


FIG. 102.—A general map of South Wales.

in the east (notably the Rhondda valley). Much of the coal is

used locally, but in 1913, 70 per cent. was exported, and the prosperity of South Wales turns largely on the coal export trade. As the coal is suitable for export to bunkering stations, and as the valleys of the east converge on and slope down to Cardiff and Newport, these ports handle three-quarters of the whole, leaving about a quarter to be exported by Swansea and Port Talbot. The shipbuilding and repairing industry of Cardiff is subsidiary to and dependent on the coal trade, which has been very depressed since the War.

Amongst other industries the refining of oil by the Anglo-

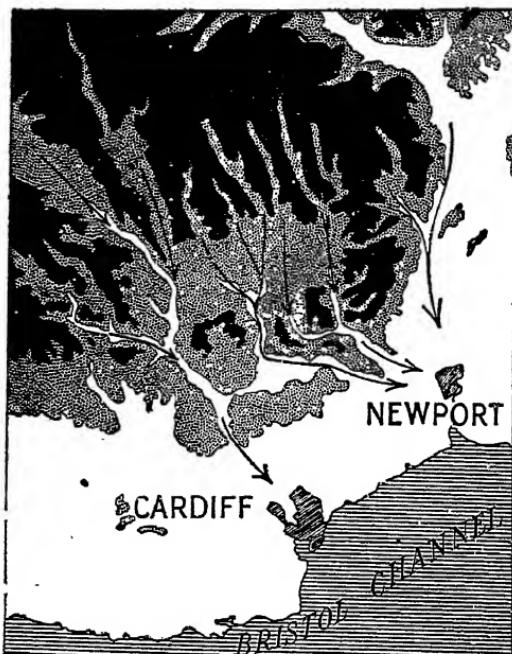


FIG. 103.—A sketch map showing how coal is sent from the valleys of the S. Wales coalfield to the ports of Newport and Cardiff.

Iranian (formerly Anglo-Persian) Oil Company a few miles east of Swansea has made that port the largest oil-importing port in the kingdom.

(f) *The Coastal Plateaus of South Wales.*—Lying to the south of the elevated plateau region which corresponds roughly with the South Wales Coalfield and its border, is a series of three low plateaus, respectively those of South Pembrokeshire, Gower, and the Vale of Glamorgan. In the first two areas folded Old Red Sandstone and Carboniferous Limestone are present, but the surface of the country has been worn down into an undulating, featureless plateau which rarely exceeds 300 or 400 feet in height. Light shallow soils are the rule; much of the land is under pasture, and dairy farming is

the leading occupation, though considerable areas are tilled—for oats or fodder crops. The geological map shows that the so-called "Vale" of Glamorgan is a detached area of the Jurassic rocks of the Midlands of England. Its pastures play their part in supplying milk to Cardiff and the eastern valleys of the coalfield, and so too does the small alluvial plain bordering the Severn further east.

(g) *The Welsh Borderland*.—At first sight the "Welsh Borderland" seems a very indefinite area. But separating the Welsh massif of old rocks as a whole from the plains of Midland England, there is a line of hills stretching almost due north and south. At the northern end of the "outer rampart" of the Welsh massif is the Wrekin, whilst the southern part is formed by the well-known Malvern Hills. Within this barrier, and between it and the Welsh mountains properly speaking, lies a belt consisting mainly of upland country. This includes the upland of the southern half of the county of Shropshire (the northern half is part of the plain of Lancastria); west of this lies the pleasant rolling country, largely farmlands, of the so-called Clun "Forest" and Radnor "Forest." Between the Malvern Hills and the wild Black Mountains is the fertile Plain of Hereford. Here the red soils of the softer Old Red Sandstone marls give fine orchard country and cattle pastures, so that Hereford cider and Hereford bulls are equally famous. Similar country continues southwards into Monmouthshire and wraps round the eastern end of the South Wales Coalfield. In the midst of the Monmouthshire area lies that curious little coal basin, a replica in miniature of that of South Wales, the Forest of Dean.

Devon and Cornwall.—Unlike the Lake District and Wales, the third of the ancient blocks of the west does not form a rugged, mountainous area. Instead, the South-Western Peninsula may be described as a rolling plateau rising but gradually to its greatest heights amongst the "tors" of Dartmoor and Bodmin Moor. It is well known that much of the scenery in the interior of Cornwall is tame and uninteresting, but wherever the plateau reaches the coast there is that magnificent cliff scenery for which the peninsula is justly famous. Devon is more varied, because of the wide stretches of heather-covered moorland and the many picturesque valleys.

The whole peninsula is built up of a much crumpled syncline (just the opposite of the Southern Uplands region of Scotland, which is a crumpled anticline) with an east and west trend, parallel to that of the South Wales Coalfield. The rocks are mostly sandstones and hard slatey rocks. The whole has been penetrated by a number of great granite masses (Dartmoor, Bodmin Moor, Land's End, etc.), each of which gives rise to a tract of higher ground, and the highest parts are formed by tumbled masses—called tors—of

granite boulders. Figs. 104 and 105 show that, with the exception of Exmoor, all the higher parts of the peninsula are built up of granite. It is believed that the peninsula was planed down to its present plateau character by the action of ancient seas which must once have swept over it. Indeed, the deposits laid down in these seas are found wrapping round the eastern end of the old mass, and so there is a belt of country in eastern Devon where patches of chal-

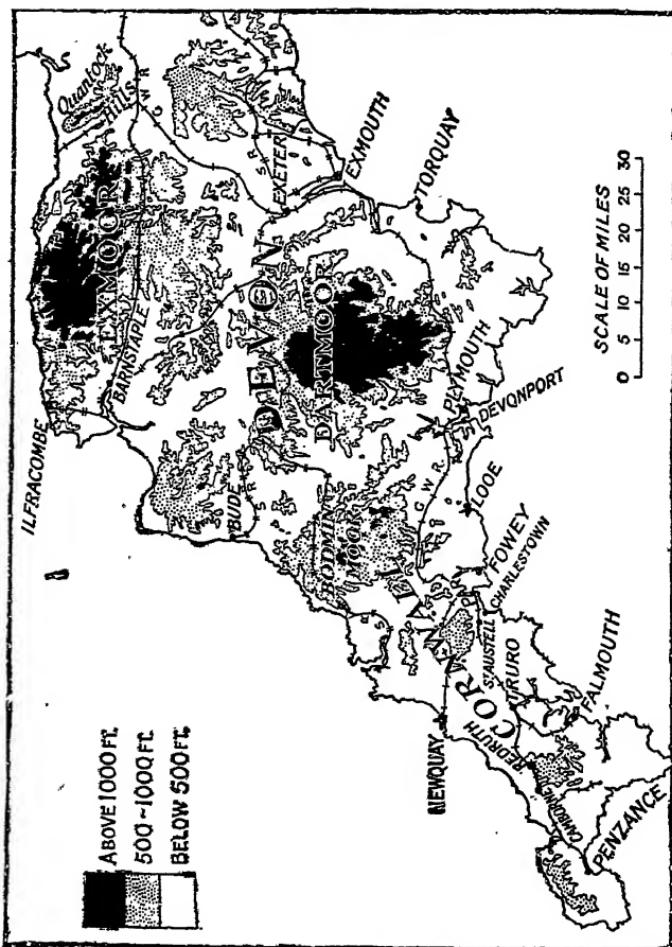


FIG. 104.—Physical map of Devon and Cornwall.

and other rocks occur, and which is thus a transition belt. The Quantock Hills of Somerset may be regarded as a detached mass or "island" of ancient rocks like those of Exmoor.

From ancient times Cornwall has been famed for its mineral wealth. The mineral deposits are associated especially with the northern and north-western margins of certain of the granite masses, and the principal mining district is that around Camborne and

Redruth. The chief ores are tin ore and copper ore. Of recent years the mining industry has not been very flourishing; competition from the richer and more cheaply worked ores abroad has been the chief trouble. Another mineral is china clay, a decomposition product of granite found in gigantic pockets on the surface of some of the granite masses, especially that of St. Austell. It is dug out

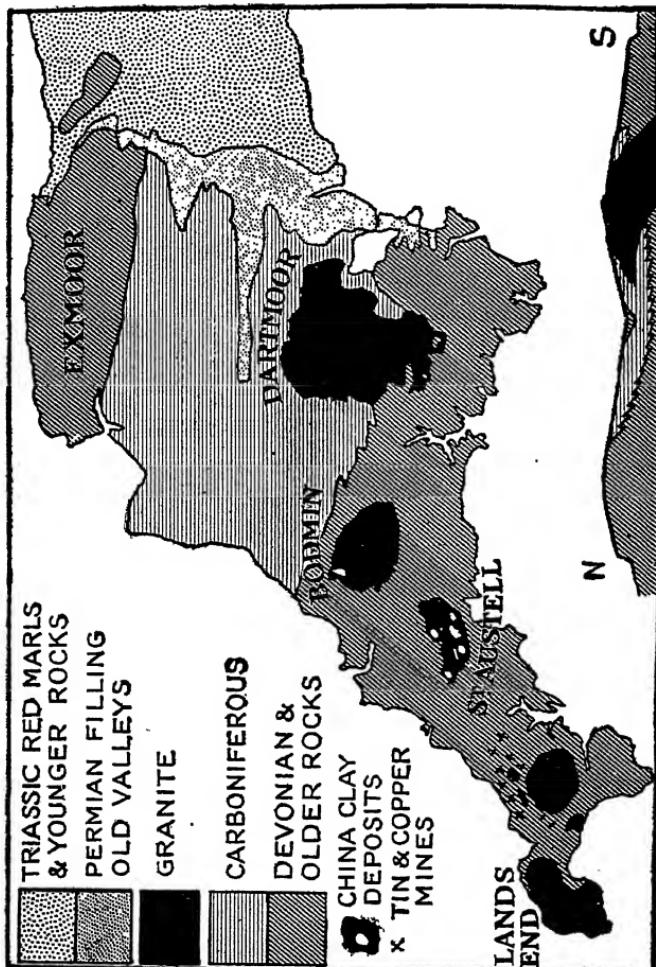


FIG. 105.—Geological sketch map of Devon and Cornwall.
Notice the connection between the high ground in Fig. 104 and the granite masses in this map.

and washed and shipped from a number of little ports (such as Fowey, Par, and Charlestown), not only to pottery districts of the Midlands, but also to the Continent. Good slate is quarried when there is a demand for slates (people prefer to roof their houses with tiles now) and granite is quarried in some areas.

In winter the peninsula lies in the mildest parts of the British Isles. It is true that strong and cold winds sweep over the surface

of the plateau, so that trees are rare except in sheltered spots, and fierce waves beat along the rocky coasts, especially in the north, but the effect of the mild climate is seen in the sheltered valleys all along the south coasts. There snow is practically unknown, and even frosts are comparatively rare; sub-tropical plants grow out in the open. In January the Scilly Isles and Penzance are nearly ten degrees warmer than London, and have an average January temperature equal to that of parts of the French Riviera, though they do not get so much sunshine.

The effect of the climate is well seen in the agriculture. Much of Cornwall is cultivated (see Fig. 67), and root-crops, in particular, grow well on the richer red soils. Considered as a whole, the three south-western counties of Cornwall, Devon, and Somerset are great dairying counties. The richness of Devonshire cream is proverbial, whilst Cornwall is worthy to be ranked with Devon, and much of London's best milk comes from Somerset. Geographically particular interest attaches to the special produce of the sheltered valleys of the south of the peninsula and of the Scilly Isles. These specialize in early potatoes and other vegetables for the London market, and of recent years there has sprung up a considerable trade in cut flowers.

From what has been said, it is not surprising to find very many of the towns and villages of the south-west nestling in the little valleys along the coast. There are many little fishing villages—such as Looe and Polperro—and a number of considerable towns where a larger inlet has afforded a good harbour. There is Penzance, the port for the Scilly Isles; Falmouth, with its large harbour; Fowey, which in the days of Queen Elizabeth had a shipping fleet of the first order and sent many men and ships to fight the Spanish Armada; Plymouth and Devonport with its naval dockyard. The tourist industry is the mainstay of such towns as Exmouth, Torquay, Newquay, Ilfracombe, and Bude. Truro is the cathedral and market town of Cornwall, but Exeter lies on the eastern border of the region, of which it may be described as the focal town.

Having no coal, the South-Western Peninsula has not been greatly affected by the Industrial Revolution. But the construction of railways—notice how their direction is controlled by physical features—has linked the peninsula very closely with the remainder of southern England.

The Triassic Plain of the Midlands.—The Midlands of England, in a somewhat restricted sense, consist for the most part of lowland and occupy a V-shaped area. The southern end of the Pennines fits into the centre of the "V," the left arm of which joins the lowlands of Cheshire and Lancashire, through the Midland Gap, while the right arm joins the lowlands of the Vale of York by way

of the broad lower Trent Valley. Geographically the Midlands so defined may be regarded as bounded on the south-east by the first of the "scarpes" which make up the scarplands of south-eastern England. On the west the Midlands stretch as far as the edge of the Welsh massif, which has already been described. The point of the "V" stretches to the Severn estuary. The Plain of Somerset forms an important detached area of similar character. The most important of the geological formations in the Midlands is the Upper Trias or Keuper Marls which weather to a rich red soil excellent for cattle pastures and for cultivation. The Triassic marls are very similar to the Old Red Marls of Herefordshire. Both give rise to lowlands. The Lower Trias or Bunter is a formation of sandstones which results in a rather higher and more barren country, such as the Cannock Chase plateau. The whole of the Trias was originally laid down in a shallow inland basin under almost desert conditions (compare the Great Salt Lake of Utah at the present day), hence the deposits of salt associated with the Keuper. The Triassic deposits are found wrapping round masses of older rock which formed islands in the old lake basin. The "islands" include the small coalfields of the Midlands, and since they give rise to industrial areas in the midst of country otherwise agricultural they will be considered separately, together with the "islands" of still older rocks.

The "Islands" of Old Rocks in the Midlands.—These islands of old rock are best remembered with relation to the southern end of the Pennines. Taking a point at the southern end of the central limestone core of the Pennines, just west of Derby, we can draw radiating lines each passing through one of the old islands. This has been done in Fig. 106.

(a) *Charnwood Forest* lies to the south-east of the Southern Pennines. It consists of very ancient rocks—comparable in age with those of the Highlands of Scotland, though all but the highest hills of the ancient island have been covered with Triassic deposits. But the geology makes Charnwood Forest quite different from the surrounding country. There are pretty wooded hills and winding leafy lanes, and the whole area is one of the playgrounds of the Midlands. Some of the old rocks are quarried for road metal which is used all over southern England.

In the valley to the south-east of Charnwood lies Leicester, an old market town in the centre of sheep-rearing and cattle country. The Leicestershire breed of sheep is world famous, and it is not difficult to see how Leicester came to have its two staple industries of hosiery (originally from the fine local wool) and boots and shoes (from the leather obtained from local cattle).

(b) *The Leicestershire Coalfield* lies next to Charnwood Forest on the west. It is one of the few coalfields of England which has

not given rise to an extensive industrial area. The coal towns of Coalville, Ashby-de-la-Zouch, etc., are still quite small.

(c) *The Nuneaton Ridge*, a narrow ridge of ancient rocks similar to those of Charnwood Forest, lies almost due south of Derby.

(e) *The Warwickshire Coalfield*, sometimes called the Nuneaton Coalfield, lies to the west of the Nuneaton Ridge, just as the Leicestershire field lies to the west of Charnwood Forest. Nuneaton and

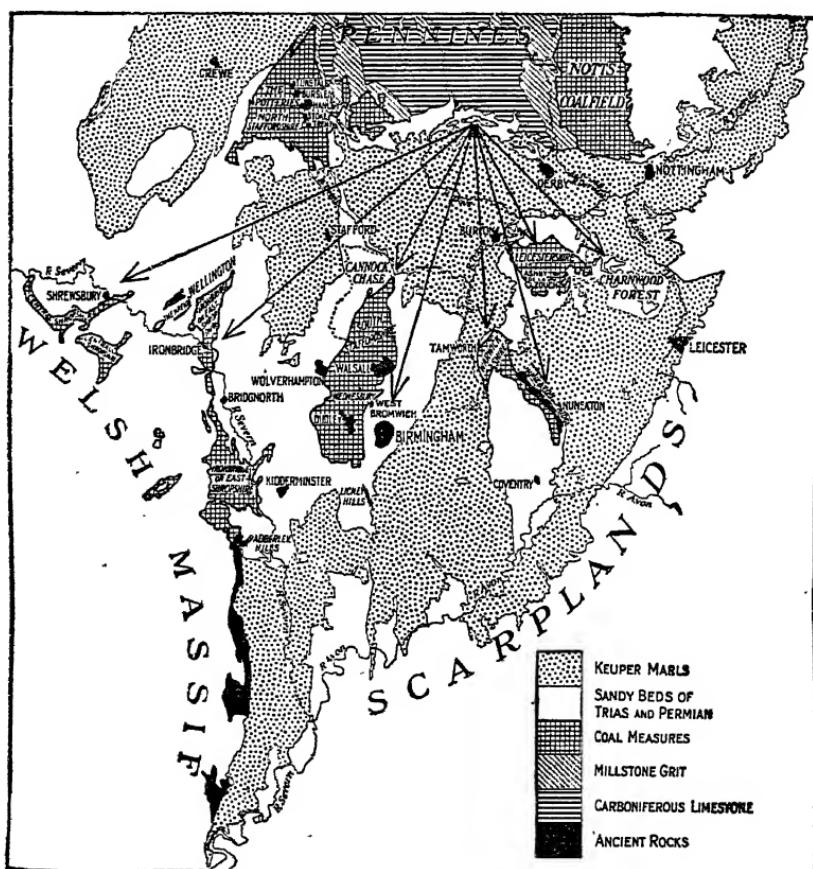


FIG. 106.—The ancient islands of the Midlands.

Tamworth may be called the foci of the coalfield, but the great industrial town of this region lies to the south of the coalfield itself. This town is Coventry—associated with bicycles, motors, and artificial silk.

(e) *The Lickey Hills*.—Due south from the centre of the Pennines the line passes nearly through Birmingham and then through a very small island of ancient rocks like those of the Nuneaton Ridge—these are the Lickey Hills.

(f) *South Staffordshire Coalfield.*—This large and important coalfield lies immediately to the north-west. The northern part is a broad plateau, continued northwards by Bunter sandstones and known as "Cannock Chase." Associated with this coalfield is the famous "Black Country." But the Black Country started to get black long before the development of the coalfield, and that is at least one reason why the greatest city of the Midlands, Birmingham, is not actually on the coalfield itself. The early function of Birmingham was that of a market town in the heart of an agricultural



FIG. 107.—A physical diagram of the Midlands.

For details of the central part, see the Birmingham sheet of the Land Utilisation Survey.

country, and it was the demand for horseshoes, nails, chains, and agricultural implements which first encouraged their manufacture in Birmingham—a manufacture made possible by the plentiful supply of charcoal from the forests of Cannock Chase. Thus Birmingham was an "iron town" in the days of the Tudors. Then followed the amazing development of the coalfield. The famous "Thick Coal" was easily mined; with it occurred bedded iron ores; near by the limestone hills of Dudley gave the necessary flux. Birmingham a hundred years ago became the centre of the English canal system; the iron industry of England was concentrated in

the South Staffordshire Coalfield, and such centres as Wolverhampton, Walsall, Wednesbury, Dudley, and West Bromwich became great towns. But the character of the Black Country has changed, and is still changing. Little iron ore is now mined, and it is expensive to bring iron ore by railway so far to the interior. The Black Country has turned its attention to the manufacture of a great variety of metal articles requiring little raw material—nails, screws, tools, domestic utensils, motors, cycles, wireless and electrical apparatus. Birmingham itself has developed even further, and has important manufactures of cheap jewellery, artificial silk, rubber, food, and drink.

(g) *The Ironbridge and Forest of Wyre Coalfield* (East Shropshire Coalfield) is a long, narrow coalfield stretching southwards from Wellington and lying along the edge of the Welsh massif. Its two main centres are Ironbridge and Bridgnorth, both on the Severn.

(h) *The Wrekin*, a hill of ancient rocks near Wellington, has already been mentioned as part of the outer rampart of the Welsh massif. It is part of the area of old rocks which occupies central Shropshire.

(i) *The Central Shropshire Coalfields*, south of Shrewsbury, are small and unimportant.

(j) *The North Staffordshire Coalfield* (or the Potteries) lies on the western flanks of the southern Pennines. Iron ores occur in this coalfield and have given rise to an important iron industry, but the area as a whole is remarkable for the concentration here of the manufacture of pottery, earthenware, and china of all types. Clays suitable for all the coarser wares are abundant and easily quarried locally, though material such as china-clay for finer types is brought from a distance. The region lies on the north-eastern flank of the Midland Gap, and is really more closely linked with the plains of Lancastria (see above). Stoke, Burslem, Hanley, Tunstall, Longton, and Fenton are the chief centres, now united as the City of Stoke-on-Trent (population nearly 300,000). Newcastle is a non-industrial residential town.

Having now dealt with the islands of old rocks which give rise to most of the industrial areas of the Midlands, it remains to note a few points about the surrounding regions of Triassic rocks. Dairying occupies an important place, with market gardening on areas of lighter soil. The rich red soils of Worcestershire, like those of the Old Red Sandstone of Herefordshire, are famous especially for their cider-apple orchards.

Amongst towns in the Triassic belt not already mentioned may be noted Burton, famous for its breweries, the local hard water containing much gypsum being especially suitable. Derby is essentially a route town—a fact reflected in its railway works and the factory where Rolls-Royce cars are made—controlling the east-

west route along the southern end of the Pennines and the routes into the heart of the Pennines. The great railway centre of Crewe lies, on the other hand, through the Midland Gap in the heart of the Cheshire plain. Stafford is at the northern end of Cannock Chase. In the south the once important carpet industry of Kidderminster was closely connected with the supply of wool. The obvious outlet of the Midlands to the south-west is down the Severn valley to the port of Bristol. A glance at the map shows both this river and its chief tributary, the Warwickshire Avon. The town of Worcester now occupies the centre of the valley of the former; the towns of Warwick and Evesham are on the river Avon, and between these two lies the fertile Vale of Evesham. Below the confluence is the natural route-town of Gloucester, and the principal port of the region is lower down the estuary at Bristol. It is difficult to assess the real position occupied by Bristol. Comparatively little of the export trade of the Midlands goes in this direction. Bristol has been associated since early days with West Indian and American trade, and to this day is connected with sugar, tobacco, cocoa, and bananas. The trade is very largely an import trade, and excellent railway communication with London makes Bristol an outport of London rather than a port of the Midlands. The city itself is situated some distance up the Bristol Avon in a narrow, winding gorge, and is thus unsuitable for modern shipping, resulting in the increasing importance of Avonmouth, the port at the mouth of the Bristol Avon (which has eclipsed Portishead the other outport).

Lying between the north-eastern corner of the V-shaped area occupied by the Triassic rocks of the Midlands and the Vale of York further north is an interesting area, which has been called the Humber Carrlands. The core of this area is the Isle of Axholme. The whole tract is characterized by the predominance of alluvium, much of which lies below the level of the sea and must therefore be drained artificially. In the midst of the area there are occasionally outlying islands of the rocks which border the region.

The Plain of Somerset.—The Plain of Somerset in many ways is a reproduction in miniature of the Triassic Plain of the Midlands. It lies between the ancient rocks of Devonshire on the west and the scarplands on the south and south-east, and is bounded roughly on the north by the Mendip Hills, an island of old rocks comparable to one of the islands of the Midlands. Much of the plain was formerly covered by marshland; this is now drained, though it is still subjected to serious floods. The whole is primarily a grazing region, with dairy produce as its leading product, but the apple orchards and the cider production show at once a close affinity with similar lands in Worcestershire and Herefordshire. In the north of the plain, closely connected with the Mendip Hills, are the small Somerset and Bristol coalfields.

The Scarplands of South-Eastern England.—Although including in its midst the great metropolis of London, the south-east of England is pre-eminently the agricultural region of Britain. It has already been pointed out that the whole of the south-east is occupied by a succession of younger sedimentary rocks. Over large areas these dip to the south-east, and so give rise to a succession of hills or ridges where the harder beds crop out, and valleys where the softer rocks occur. The hills usually have a steep scarp slope on the one side, generally to the north-west, and a long gentle dip slope on the other. Thus a succession of limestone ridges and clay vales occurs as a broad belt across England from Yorkshire through Lincolnshire to Somerset and Dorsetshire. The northern part of the belt, Yorkshire, has already been separately described, and in the remaining stretch there is an important interruption by the tract known as the Fenlands, which will be separately described. The first, and westernmost, scarp is usually a small one, formed by thin limestones in the lower part of the Lias, and it overlooks the

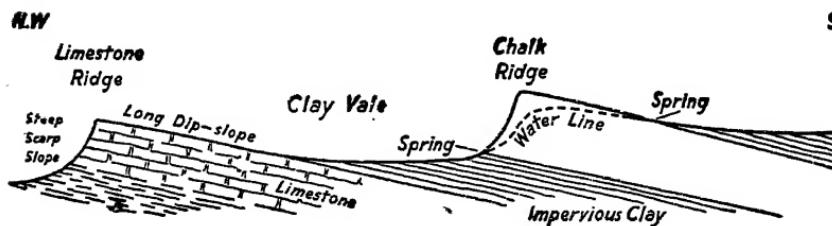


FIG. 108.—Diagrammatic section illustrating the succession of clay vales and limestone ridges found in the south-east of England.

Triassic plain of the Midlands. Then there is a broad vale of Liassic clays—often almost continuous with the Midland Plain—succeeded by a scarp due to hard beds in the upper part of the Lias. Above this the beds are more irregular and differ from place to place. The scarps swing about in different directions, die away, and start again. In some parts of the Midlands, as in southern Northamptonshire, the dip slope of the hard bands is so gradual that the structure of the country is that of a dissected plateau. The last of the scarps is the greatest and most clearly marked of them all. It is formed by the chalk. The chalk stretches from Yorkshire (where it forms the Yorkshire Wolds), through Lincolnshire as the Lincoln Wolds, then as the low hills on the borders of Norfolk and Cambridgeshire, then along the East Anglian Heights into the Chiltern Hills, crossing the Thames at the well-known Goring Gap, and forms a large part of the Salisbury Plain. The chalk occupies very large areas further to the south-east, but there are found four tracts which must be described separately, namely, East Anglia, the London Basin, the Weald, and the Hampshire Basin.

We return now to the Scarplands to consider the country between the lowest of the scarps, which is also formed by the beds lowest in geological sequence to the chalk scarp itself. This tract may be described as the Scarplands proper. For purposes of detailed study

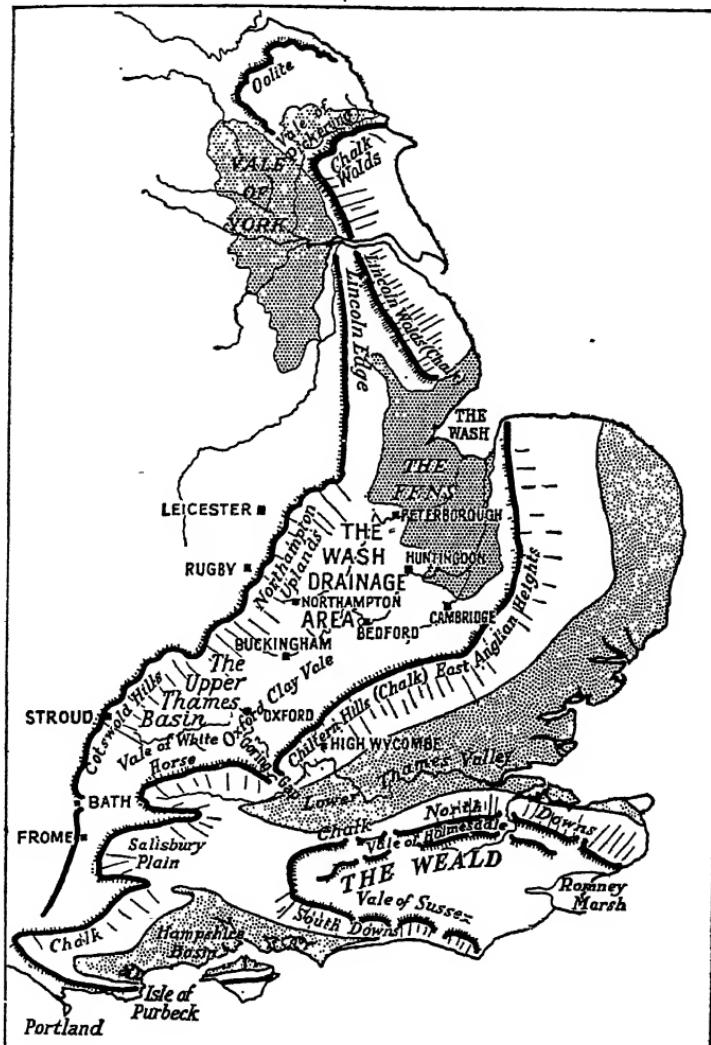


FIG. 109.—The Scarplands of the south-east of England.

it is often useful to separate this stretch of the Scarplands into four rough divisions :

- (a) Lincolnshire ;
 - (b) The drainage area of the rivers flowing into the Wash ;
 - (c) The drainage area of the upper Thames :
 - (d). The southern tract.

Before considering these four separate divisions, there are certain facts to be borne in mind concerning the whole area. The clay vales are mainly suited to permanent grass, and hence form cattle country, while the limestone ridges form grassland suitable for sheep pastures, or arable land where the soil is richer. It is especially in this part of England, the Scarplands, that one finds

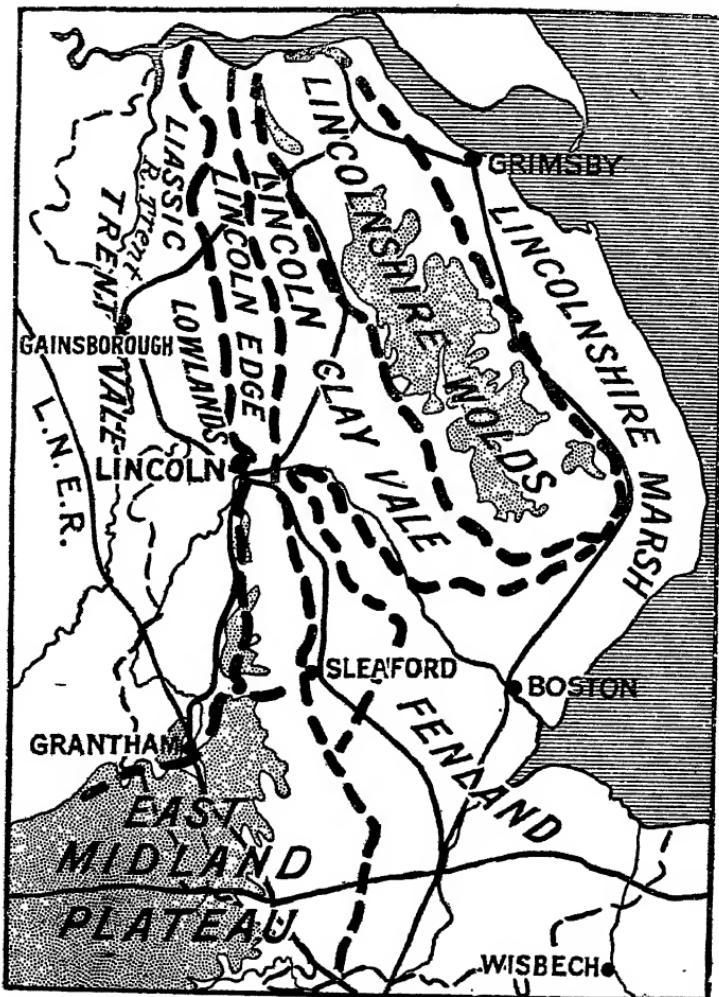


FIG. 110.—The natural regions of Lincolnshire.
Land over 250 feet, stippled.

the "close" rich country of small fields separated by hedgerows and cut up by scattered fragments of woodland, which is so essentially English. Special importance attaches to the gaps in the scarps, and most of the towns of the Scarplands are near such a gap.

Lincolnshire.—In the Scarplands of Lincolnshire five parallel strips may be distinguished :

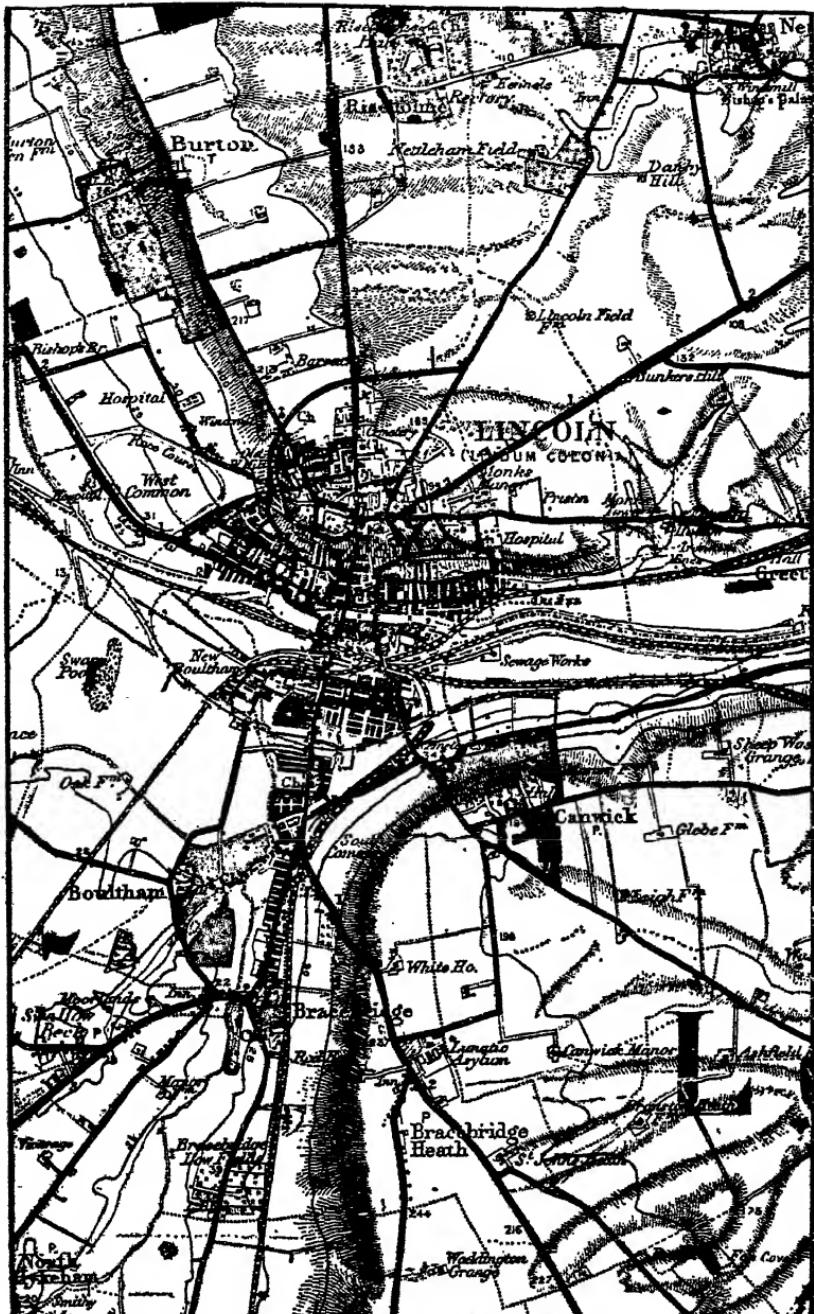


FIG. 111.—Portion of the 1-inch to the mile Ordnance map showing the position of Lincoln as a gap town guarding a gap in the Lincoln Edge. The westward facing edge of the scarp is clearly shown.

Reproduced from the 1-inch Ordnance Survey Map (coloured edition) by permission of the Controller of H.M. Stationery Office.

(a) The Liassic Lowlands form a tract running from north to south in the west of the county and fade almost imperceptibly into the Triassic lowlands of the Trent Vale.

(b) The Lincoln Edge is a well-marked scarp truncated by the Humber in the north and broken in the centre by the famous Lincoln Gap, guarded by the old Roman town of Lincoln.

(c) The Lincoln Clay Vale, where the soil afforded by the Jurassic rocks is very largely determined in character by the abundance of boulder clay.

(d) The Lincolnshire Wolds consist of chalk, but the scarp is again largely masked by boulder clay.

(e) The Lincolnshire Marsh forms the land along the Lincolnshire coast.

The Wash Drainage Area.—The outstanding feature of this area may perhaps be described as the Northamptonshire Uplands on the west, the broad belt of low country in the centre, and the chalk ridge of the Chiltern Hills and the East Anglian Heights bounding the flanks on the south-east. The scarp of the Northamptonshire Uplands overlooks such towns as Leicester and Rugby, which really belong much more to the Triassic Plain of the Midlands. The Northamptonshire Uplands are most important, because they contain Britain's greatest reserve of iron ore. The ore occurs in beds of from six to ten feet in thickness, and is gradually taking a more and more important place in the supply of British iron ore. In the lowland area lie the county towns of Northampton, Buckingham, Bedford, Huntingdon, and Cambridge. The whole area is predominantly rural; the industries which exist in some of the towns are not difficult of explanation—for example, the boot and shoe industry of Northampton. Near Peterborough is the greatest brick-making area in the British Isles, since the Oxford clay which occurs there is particularly suitable for brick-making. The influence of London is now stretching beyond the chalk escarpment, and the present prosperity of the furniture-making industry at High Wycombe, to quote but one example, is perhaps associated with the influence of the metropolis.

The Drainage of the Upper Thames and its Tributaries.—This area may be called the Oxford Basin, since Oxford lies almost in its geographical and its geometrical centre. To the north-west lie the Cotswold Hills and Edge Hill: the short-grass sheep pasture of the hills is reflected in the development of cottage industries and the manufacture of cloth, which has developed in some places into a factory industry, giving the broadcloth industry at Stroud, Bath, and in other areas.

The Southern Tract.—The southern area of the Scarplands is the least clearly defined, and seems to form rather a fringe to the chalk girdle of the Hampshire Basin; but, broadly speaking, the same

features are here reproduced as in the areas further north. Special attention should be made of the oolitic limestones or freestones, particularly those at Bath and Portland, whilst the cloth-making industry at the Somerset town of Frome may be regarded as somewhat comparable with that already mentioned at Stroud.

Fenland.—The great flat plain which surrounds the Wash was once a wide tract of marshland covered with dense masses of rushes and sedges, intersected by sluggish streams and shallow lakes, here and there with patches of firmer ground with thickets of willow and alder, but the whole liable to flooding in winter. It formed a barrier to the movement of man, though its few islands were refuges of the persecuted (note the position of Ely). But practically the whole has been drained, and now forms one of the richest stretches of agricultural land in England. More than three-quarters of its surface is under the plough. It is the great potato-growing region of England; other root crops, including sugar beet, flourish; whilst wheat, barley, and oats are also staple crops, and much market gardening is carried on. Fruit and flower growing is a recent development. The rainfall is less than in most parts of England, the summer sunshine greater, the winter cold more intense. There are no towns of any size in Fenland: Cambridge, Huntingdon, and Peterborough lie near its borders and may be regarded as the natural frontier towns when Fenland was still a marsh.

East Anglia.—East Anglia corresponds roughly with the counties of Norfolk and Suffolk. Chalk underlies most of this tract, but it is so thickly covered with glacial and other deposits that East Anglia is very far from resembling typical chalk country. At the present day it is difficult to realize the former isolation of East Anglia. It is bounded on the north and on the east by the sea, on the south it stretched as far as the once thickly forested damp lowlands of Essex. On the west lay the impassable marshes of the Fenland; and it was only from the south-west that East Anglia could be approached along the comparatively dry route afforded by the chalk country of the East Anglian Heights. Though the former isolation has disappeared, East Anglia maintains a remarkable geographical entity. The character of East Anglia varies mainly according to the nature of the surface deposits. Overlooking Fenland on the west is a tract of poor sandy soil giving rise to barren, heathy country known as Breckland. To the north is the Greensand belt, which is only a little more fertile. The heart of Norfolk and Suffolk—a low plateau—is largely covered with boulder clay, and the soil is inclined to be heavy, but there is a great deal of local loam, and this is a region of mixed farming. To the north, and especially to the north-east, the soil is decidedly richer, and north-east Norfolk is one of the most fertile agricultural parts of England. On the best agricultural land are wheat, barley, and

root crops, but where the soil is sandy and poor there is much common land and sheep pasture ; where the heavy boulder clay predominates there is also less cultivation, and a little woodland remains. A small but distinct and very well-known region is that of the Norfolk Broads, which are wide shallow stretches of water, affording safe and pleasant yachting ; and the marshy pastures are excellent for grazing. Somewhat similar in character is the narrow alluvial plain of north Norfolk. On the coastal borderland of Suffolk the soil tends to be lighter and more sandy, and the long estuaries penetrating from the

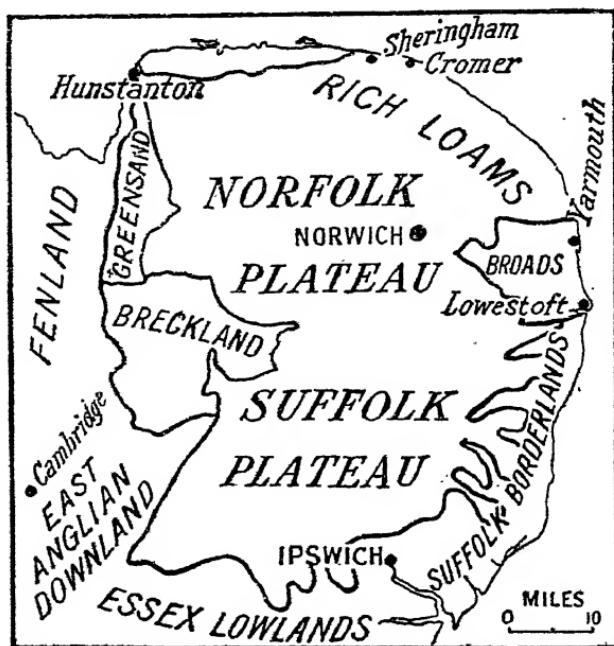


FIG. 112.—The geographical sub-regions of East Anglia.

The unnamed tract in the north is the alluvial belt. The farm lands of the Suffolk plateau really stretch further south than shown, to the limit of the boulder clay in Essex. For corrections to this map, see the Cromer, Norwich and Ipswich sheets of the Land Utilisation Survey.

sea have encouraged maritime trade. On the southernmost of the estuaries is situated the important town of Ipswich.

The principal inland centre of East Anglia, and what may be called a true provincial capital, is Norwich. Once the leading centre in England for woollen manufacture, it reflected in its leading industry the native supply of wool and the isolation of East Anglia which encouraged trade relations with the weaving district of Flanders. The well-known mustard works and the factories in which certain patent cereal foods are prepared reflect the present agricultural activities of the surrounding country. The boot and shoe industry may once have been connected with local supplies of

leather, but the industry now directly depends almost entirely on the making of ladies' fancy shoes. On the coast of East Anglia are the important fishing ports of Yarmouth and Lowestoft. Other coastal towns, such as Hunstanton, Sheringham, and Cromer, are in the main seaside resorts.

The London Basin.—The London Basin is both a geographical and a geological unit. Geologically it is a broad, synclinal basin with a clearly defined chalk rim and a central portion occupied by sands and clays, valley gravel, and alluvium. The most important of these young sedimentary rocks which fill the basin is the London Clay. It is also a geographical basin, with the chalk forming hills both on the north and on the south. The chalk hills which bound the basin on the north-west are the Chiltern Hills, fading north-eastwards into the less distinct East Anglian Heights. Those on the south are the North Downs. The two lines of hills are arranged like the two arms of a V, the point of the V being in the west in the neighbourhood of the narrow Kennet Valley. The Thames enters the basin by cutting through the northern group of hills in the well-known Goring Gap. Geographically the whole London Basin may conveniently be considered as falling into three parts :

- (a) The western basin, between the Goring Gap and London ;
- (b) London itself, and
- (c) The eastern basin comprising part of Essex and Kent.

Of special importance to London are the gaps, usually occupied by rivers, through the encircling ring of chalk hills, and nearly all the main roads and railways out of London pass through one or other of them. On the south, from east to west, they are as follows :

- (a) The Medway Gap, where the Medway emerges from the Weald to empty into the Thames estuary—a gap guarded by Rochester, with its Norman castle, and Chatham, with its naval dockyard.
- (b) Shoreham or Darent Gap, leading to Tonbridge.
- (c) Caterham and Reigate Gaps, controlled by Croydon.
- (d) Dorking or Mole Gap, followed by the main Worthing road.
- (e) Guildford or Wey Gap, used by the main Portsmouth road.
- (f) Basingstoke Gap, used by the Salisbury road.
- (g) Kennet Valley, leading to Bristol.

On the north, from west to east, the chief gaps are :

- (a) Wendover Gap, leading to Aylesbury.
- (b) Dunstable Gap, followed by the main road to Chester.
- (c) Stevenage Gap, leading to Bedford.

The London Basin is open to the north-east, but in ancient days the London Clay region of Essex was thickly clothed with forest—

Epping Forest and a few small tracts being all that now remain. These forested lowlands formed the natural limit of the London Basin,

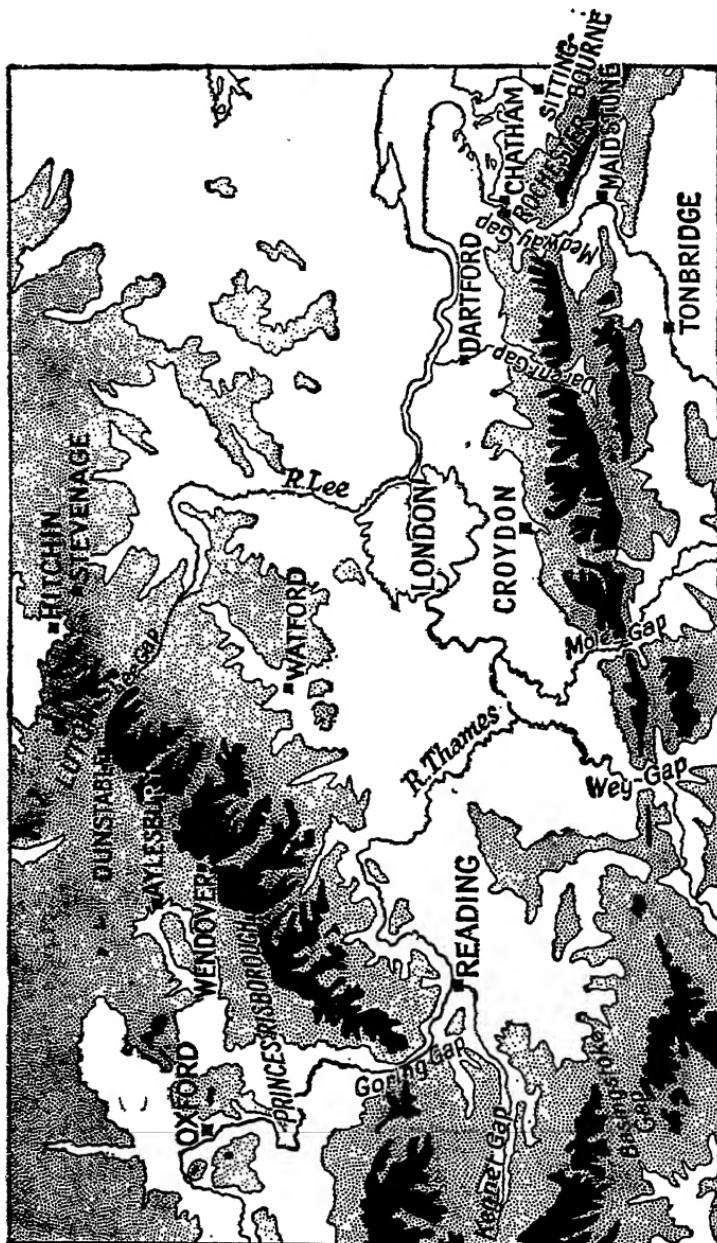


Fig. 113.—The London Basin, showing gaps through the chalk hills of the north (Chilterns) and of the south (North Downs).
Land over 500 feet, black; over 250 feet, dotted.

and have already been mentioned as cutting the area off from East Anglia.

Considering first the western basin, it may be said in the broadest

possible way that the chalk downs are sheep-farming country, with arable farming where patches of gravel or loam ameliorate the conditions due to a pure chalk soil. A noteworthy feature of the chalk hills is the succession of "dry valleys," so that the country is much cut up though running water is rare. The younger rocks of the basin itself are suitable in the main to arable farming,

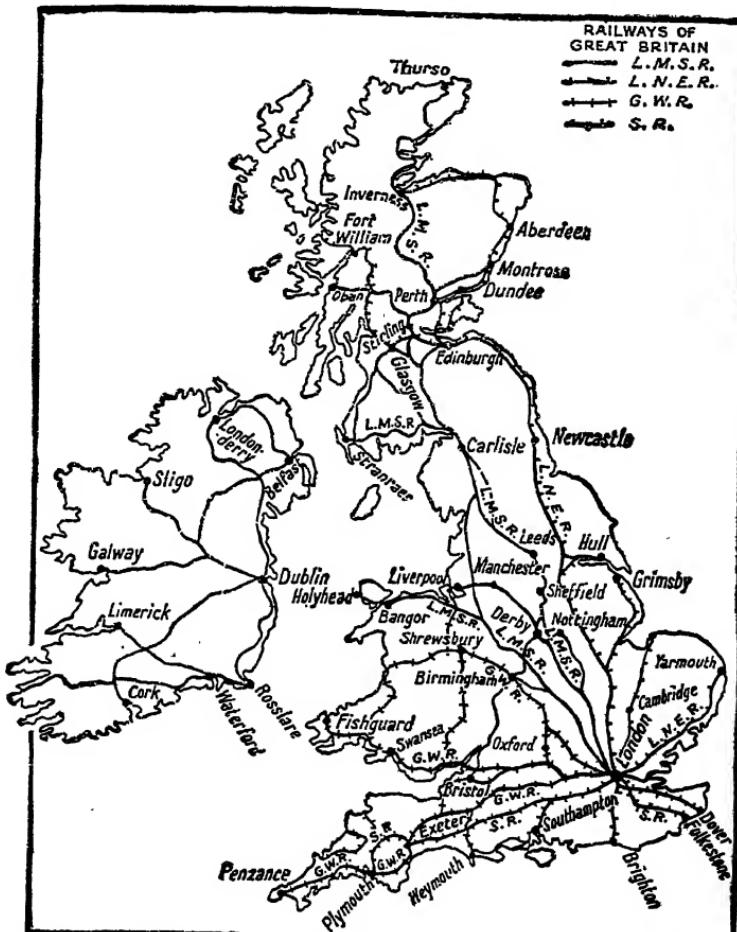


FIG. 114.—Railway map of the British Isles, showing the significance of London as a route centre.

especially on the better drained tracts of gravel. But large stretches of sandy soil give rise to heathlands with pine woods, as in the Bagshot Heath district of Surrey. Areas of very stiff clay, such as the broad stretches of London Clay, remain under permanent grass or under damp oak woodland.

The eastern London Basin as a whole is distinguished by the possession of a broad coastal plain, with drowned valleys along which

the sea has penetrated some twenty miles into the land, and beyond that plain by the great spread of boulder clay, which has blended with the underlying rocks in forming soil. To the south of the Thames the northward slopes of the North Downs are covered with Tertiary deposits of very varying character, which have given rise to a very rich loamy country, almost ideal for the growth of fruit and vegetables for London's market; whereas the heavier soils to the north in Essex are being developed as dairying country.

Actually the life of the whole basin is dominated by that of the capital itself. Residences of daily workers in the metropolis stretch as far as the chalk hills and even beyond them. Much land is occupied in this way and by large estates. Indeed, the greatest pressure on land round London is from the need for further residential areas. With the electrification of practically all the suburban lines of the Southern Railway, workers can get much more easily and quickly further out into the country; to the north the development of various underground railways, which some distance out from the inner ring emerge from under the surface of the ground, performs a similar function. It is interesting to note that according to recent census returns the population of the heart of London is actually steadily decreasing, as the pressure on space available for offices precludes the possibility of continued residence within the inner urban area. The difficulty of finding land for factories has caused many companies to move their works and offices to one of the smaller towns within, or even beyond, the limits of the basin. Thus London's paper is manufactured at St. Mary Cray, at Sittingbourne (where there are facilities for importing and storing the bulky wood pulp); many of London's books are printed at such outlying towns as Luton, Watford, Colchester, and Guildford, or even (like this book) as far away as Beccles in Suffolk. London's oil is refined far down the Thames estuary at Shellhaven; much of London's food is prepared at such centres as Reading and Maidstone, much of London's medicine at Dartford. There has been a remarkable increase in manufacturing industries around London in recent years, with the result that the pressure on agricultural land in the basin has been further increased. This is very apparent to the west, between London and Reading. The Port of London dominates the whole of Thames-side from London bridge to Tilbury, the whole area now coming under the Port of London Authority. Amongst the important Thames-side manufactures may be mentioned that of Portland cement, using chalk and Thames mud as the necessary ingredients, an industry which is also carried on near the estuary of the Medway, guarded by Rochester and Chatham. Greater London has a population of between six and seven million, and is thus the largest urban area in the world, unless New York can now claim that privilege; naturally this vast population domi-

nates the whole of the activities of the surrounding basin. In this connection should be mentioned the Surrey heathlands as a Saturday afternoon or Sunday playground, the use of large tracts as playing-fields as near as possible to the metropolis, and going further afield, the significance to the London Basin of the development of seaside towns on the south-east coast. Little has been said of the initial reasons for the site of London. Doubtless the presence of a hill—the hill on which St. Paul's Cathedral now stands—as affording firm ground for building the site of a village overlooking a river, dictated the original position, more especially as this hill seems to have overlooked the lowest ford over the River Thames somewhere in the neighbourhood of London Bridge. When one is tempted to wonder how the Thames at London could ever have been fordable, one must remember that the river has been through the centuries gradually more and more constricted within a narrow channel, and not allowed to spread over considerable tracts of marshland as it

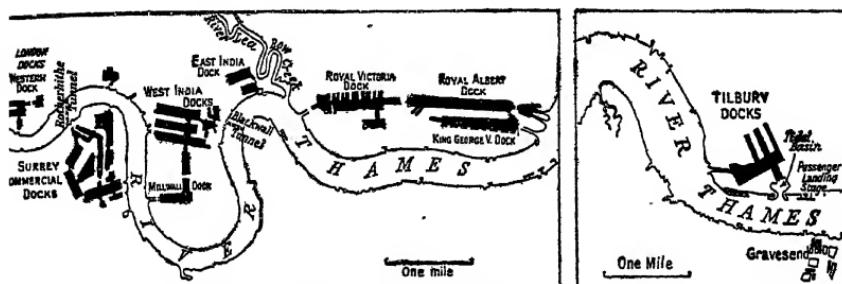


FIG. 115.—The docks of the Port of London.

once must have done. It is interesting to notice, however, that London still remains the lowest bridge town on the River Thames, and that large ocean-going vessels can still approach to the very foundations of London Bridge itself.

The Weald.—Originally the whole of south-eastern England was covered with a thick mantle of chalk. During the great Alpine series of earth movements—commencing at the very beginning of the Tertiary—a great bulge or dome, elongated from east to west, was formed in that part of the country now occupied by the counties of Kent, Surrey, and Sussex. From the central ridge of this upfold rivers drained off to north and to south: their direction was the consequence of the structure of the ground, and hence such streams are called "consequent." As the rivers and other agents of denudation got to work, so the chalk was entirely removed over the central area and the underlying rocks were exposed. The softer beds, such as the clays, were worn away by streams running into the consequent rivers at right angles. These streams developed subsequently to the earlier ones and so are called "subsequent."

But layers of harder rocks were also exposed in the heart of the Weald; at a still later date the Straits of Dover were cut by the sea across the eastern end, so that the eastern end of the Weald is actually in France. In the heart of the Weald, as it is to-day, is a group of sandy beds, joining hills once covered with thick forest, and so often known as the "Forest Ridges." Surrounding these central hilly tracts is a belt of lowland where the Weald Clay is found; then a belt of hills formed by the harder beds of the lower Greensand, then again a valley (called in the north the Vale of Holmesdale) marking the position of the soft Gault Clay. Then comes the main ridge of all—formed by the chalk—well known as the North Downs in the north and the South Downs in the south. The Downs present a steep scarp slope inwards towards the heart of the Weald, but generally a long, gentle dip slope in the reverse direction. Sometimes the dip is steep and the chalk (as along the famous Hog's Back, west of Guildford) forms a long, narrow ridge. To the north the North Downs slope away to the lowland of the Thames basin and estuary. The South Downs in the east pass



FIG. 116.—Section across the Weald from north to south.

likewise into the Hampshire Basin. Although the Weald is a very well-marked whole, it will be seen that it comprises a number of different parts which may now be separately considered.

(a) The Forest Ridges, or the High Weald, once densely forested, and later important for the supply of timber and then charcoal for the now defunct iron industry, were largely cleared during the later Middle Ages.

(b) The Weald Clay vale is largely occupied by pastureland, and villages are comparatively few.

(c) The Greensand Ridge affords a tract of well-drained land with numerous springs on the flanks of the ridge—and hence with many villages. The land is highly cultivated (fruit, hops, etc.) in Kent, but at the western end of the Weald there is a broad tract where the soil is poor and where there are wide stretches of heathland.

(d) The Vale of Holmesdale is another tract of damp pasture suitable for cattle and especially dairy cows.

(e) The Chalk Ridge is largely covered with short springy turf, famous especially as sheep pastures on the South Downs.

But on the North Downs numerous superficial patches of clay give rise to woodland ; on the lower slopes large areas are cultivated. Villages tend to be small and widely scattered on the open chalk downland, but are numerous along the junction of the chalk with clays and sands of the London or Hampshire basins. Here there is a line of springs, and in North Kent the chalk area fades into :

(f) The Tertiary and Estuarine belt with its very fertile orchard lands, hop gardens, and market gardens.

(g) Romney Marsh, now drained and occupied by pastures, must be looked upon as a separate tract. Curiously enough it is especially famous for its sheep—the Romney Marsh sheep being adapted to live on comparatively damp land, and so useful in other parts of the world where conditions are comparable.

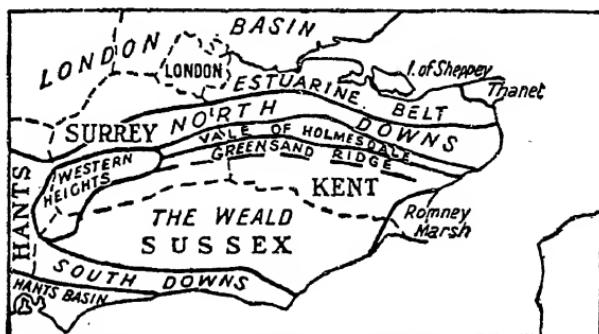


FIG. 117.—The sub-regions of the Weald.

Strictly speaking, the Weald may be regarded as limited by the main crest of the chalk scarp ; but it is convenient here to consider the chalk area as well.

When one remembers that the chalk ridge maintains an average elevation of 500 to 700 feet, and that there is a drop of 400 feet or more to the Gault clay vale, the importance of gaps through the ridge is at once apparent. Along the North Downs the chief gaps and gap towns from west to east are : the Wey Gap (Guildford) ; Mole Gap (Leatherhead and Dorking) ; Merstham Dry Gap (Redhill and Reigate) ; Medway Gap (Rochester) ; Stour Gap (Canterbury). Along the South Downs are the Arun Gap (Arundel), Adur, Ouse, and Cuckmere Gaps.

But the whole Wealden area lies within the immediate sphere of influence of London.

The Hampshire Basin.—In many ways the Hampshire Basin resembles the London Basin. There is a surrounding girdle of chalk downs and a central region of later clays and sands. Instead, however, of the basin being open to the sea to the east, its southern

chalk rim has been cut through by the sea in two places—at each end of the Isle of Wight. Although, strictly speaking, the Hampshire Basin might be limited to the central area of Tertiary rocks, it is convenient to describe here under this title the surrounding area of chalk downs also. Thus defined, the area concerned lies within a fifty mile radius, roughly a semicircle, from a centre at the Needles in the Isle of Wight. Within this tract there are three main divisions :

- (a) The Tertiary belt of the centre ;
- (b) The surrounding chalk lands.
- (c) The fringe of older rocks.

The Tertiary lowlands of the centre of the basin are rather more varied in character than the corresponding tract of the London Basin. There are in the south-west sandy tracts covered with

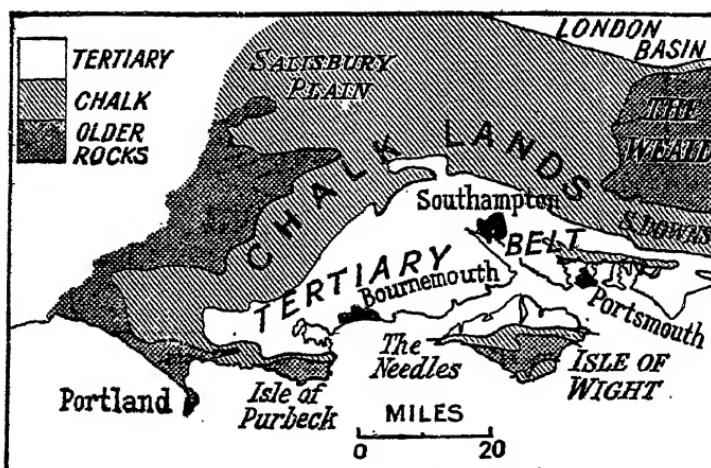


FIG. 118.—The Hampshire Basin.

heathland and comparable with the Bagshot area of London. Included under this we may mention the great New Forest area, but for the most part the Tertiary rocks give rise to mixed sands and loams suitable on the whole for mixed farming, and this is an area which has been showing marked development of recent years, with specialization in market gardening and fruit-growing. The chalk uplands occupy more than half of the whole area under consideration. The upper chalk soils tend to be dry and thin, and to be covered with the well-known short turf of the chalk downland. Such land fades into the Salisbury Plain of Wiltshire to the north of the country. Where the presence of superficial deposits modifies the character of the soil, farming is practised, and there are large areas of arable land. The crops are root crops for the feeding of the sheep as well as wheat and potatoes for human food. The

damper valleys of the chalk country are occupied by permanent pastures and permit the keeping of a limited number of cattle. The fringing vales referred to above are really outlying fragments of the scarplands of England. The so-called "Isles" of Purbeck and Portland belong to this category. The southern half of the Isle of Wight, with its Greensand beds, is more comparable with the Weald. The Hampshire Basin as a whole is largely out of the reach of London influence, but of the two great towns, Southampton and Portsmouth, Southampton is essentially London's outport for the trans-Atlantic and African services, whilst Portsmouth in the great dockyard for the southern coast. Bournemouth and the sheltered resorts of the Isle of Wight are favourite seaside places, whilst Salisbury Plain, to the north of the basin, is *par excellence* England's military training camp. The remarkable rise of Southampton deserves more than passing mention. It has the initial advantages of the large, sheltered Southampton Water, with its well-known double tide, but as a port and industrial centre it is very largely the creation of the Southern Railway. There are both dry dock and floating dock accommodation for the largest vessels afloat. It is, in addition, a port of call for German and other foreign trans-Atlantic steamship lines, a position which could scarcely be occupied by London.

The Channel Islands.—Although they lie so much nearer the French coast than the English, the Channel Isles have long been under British influence. In the days of William the Conqueror the islands formed part of the domain of the dukes of Normandy, but after the conquest of England by Normandy they utilized their position to play off one country against the other, and at the same time to develop their own independence. So even at the present day, though part of the British domain, they preserve a very considerable degree of independence. They are administered according to their own laws, and are not bound by the Acts of the British Parliament unless especially named in them. The principal islands are Jersey, Guernsey, Alderney, and Sark, but for purposes of government the whole group is divided into two : (1) Jersey, and (2) The bailiwick of Guernsey. Each has a governor and a government. British income tax and customs dues are not in force ; both units have their own coins ; the official language is French, though English is everywhere spoken.

Dangerous currents set round the islands, especially near the group of rocks known as the Casquets. The passage to the coast of England is often stormy, as even summer visitors know, but the islands themselves enjoy a genial climate. Frost and snow are rare, and sunshine is more abundant than in southern England, and these climatic features are responsible for the two main industries of the islands—the production of early vegetables, fruits and flowers, and the tourist industry. The soil is fertile, and seaweed is used as a

fertilizer. Small holding and intensive cultivation are characteristic of the islands, Jersey specializing in early potatoes (which occupy half the arable land), Guernsey in bulbs, flowers, tomatoes, and grapes. Jersey cattle are, of course, world-famous, though not numerous. Since the development of this export trade to Britain (worth about £3½ millions, annually) and the encouragement of tourists the islands have become very prosperous. Fishing and quarrying of stone are subsidiary occupations. St. Helier is the chief town and port of Jersey, St. Peter Port of Guernsey.

IRELAND

THE island of Ireland, with an area of rather over 30,000 square miles, is approximately the same size as Scotland, and about a



FIG. 119.—Ireland, political.

quarter of the area of the whole of the British Isles. Geographically the whole island ought to be considered as a unit, and from 1801 to 1919 was governed as part of the United Kingdom of Great Britain

and Ireland. From very early times, however, Ireland had been divided into the four provinces of Ulster, Leinster, Munster, and Connaught. The desire which had existed for many years in Ireland for Home Rule came to a head in 1919, when Ireland declared itself a republic. The people of the greater part of Ulster, however, refused to join the Irish Republic, and hence the division of the island into Southern Ireland, comprising twenty-six of the old counties, and Northern Ireland, comprising six counties : the two parts being now known as the Irish Free State and Northern Ireland.

Northern Ireland

Introductory.—Since 1920 the six counties of Antrim, Armagh, Down, Fermanagh, Londonderry, and Tyrone have formed "Northern Ireland." Northern Ireland is part of the United Kingdom of Great Britain and Northern Ireland, but has a parliament of its own, sitting at Belfast. It has an area of 3,500,000 acres, which is approximately one-sixth of the whole island, and a population in 1926 of 1,256,000. It includes the important industrial centre of Belfast (the capital city), with a population of 415,000, and also the ports of Londonderry, Coleraine, and Newry ; the remainder of Northern Ireland is mainly rural, and the people live in scattered farm-houses or in widely separated market towns or villages.

Physiography and Structure.—It has already been pointed out that Ireland consists of a central lowland surrounded by an irregular rim of mountains, and that the mountains of Northern Ireland are continuations of the great masses of northern Scotland. We must now consider its physiography and structure in slightly greater detail. It might be expected that we could divide Northern Ireland into three primary divisions.

(a) The Northern Mountains, akin to the Highlands of Scotland, lying north of the great boundary fault. The loftiest parts of these mountains are known as the Sperrin Mountains.

(b) The continuation of the Midland Valley of Scotland, occupied by Carboniferous limestone and other Carboniferous rocks.

(c) The continuation of the Southern Uplands of Scotland, comprising the country to the south of the boundary fault, which passes roughly along the southern shore of Belfast Lough.

Actually, however, the structure is complicated by the fact that the Chalk Sea spread over the greater part of Northern Ireland and wore down the ancient rocks, and also the rocks of the midland plateau, and deposited over them thick layers of chalk. At a later date in the Tertiary period these beds of chalk were covered by enormous stretches of basalt lava poured out from great fissures :

hence there is a huge lava plateau over a large part of the country. But this lava plateau has subsided towards the centre, where it is occupied by the somewhat shallow waters of the largest lake in the British Isles—Lough Neagh. There is, indeed, a remarkable contrast between the higher parts of the lava plateau, and the subsided central portion.

Summarizing the results, it may be said that the following natural physiographical and structural regions can be distinguished in Northern Ireland :

(1) The plateau and glens of Antrim. This comprises the higher eastern portions and edge of the basalt plateau, the narrow coastal strip which lies between the edge of the plateau and the North Channel, and the deep glens which cut through the plateau and are

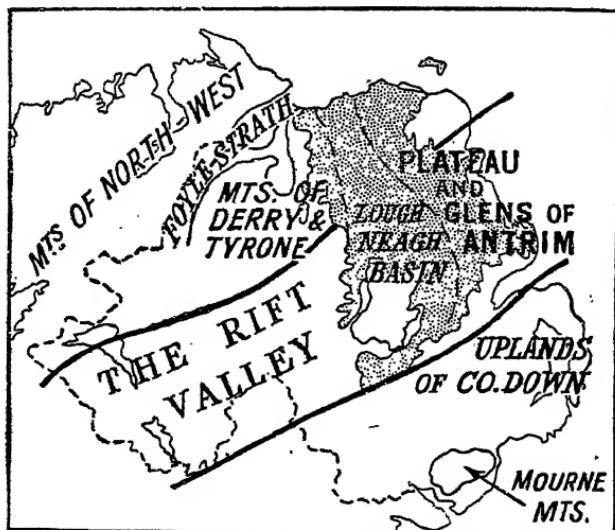


FIG. 120.—Natural regions of Northern Ireland.

useful in that they connect the coastal strip with the western interior.

(2) The Lough Neagh Basin and the lower Bann valley. This comprises the lower part of the basalt plateau, less than 500 feet above sea-level, and where the basalt rocks have weathered into a very fertile but sometimes waterlogged soil.

(3) The mountains of Londonderry and Tyrone, comprising the high western edge of the basalt plateau, and a mass of ancient metamorphic rocks which form a continuation of the Highlands of Scotland. The Sperrin Mountains form the highest and most rugged parts of the area, and culminate in peaks of over 2,200 feet high. This country is closely comparable with the Highlands of Scotland.

(4) The Foyle valley and the shores of Lough Foyle. This

comparatively fertile valley is actually cut in the ancient highland rocks, and may be compared with the broader and more fertile "straths" which are found amongst the Highlands of Scotland.

(5) The uplands of County Down. Although called an upland region because it is naturally a continuation of the Southern Uplands of Scotland, this region actually comprises considerable tracts of fertile lowlands, such as those round Strangford Lough, as well as elevated areas corresponding to the Southern Uplands. A subdivision of this area is formed by the well-marked Mourne Mountains, which mark the site of a large intrusion of granite of Tertiary age.

(6) The Rift Valley, lying to the south-west of Lough Neagh and fading into the great central plain of the Irish Free State.

These physiographical divisions have been shown in Fig. 120.

It is not necessary to add any details concerning the climate of Northern Ireland, except to make a few observations.

(1) That the area of the greater rainfall coincides with the loftier areas.

(2) That the climate round the coastal strip is milder than in the interior in the Lough Neagh basin. Actually the coastal strip is 3 or 4 degrees cooler in summer and 3 or 4 degrees warmer in winter than stations in the Lough Neagh basin. As a rule the rainfall is adequate or more than adequate: excess of moisture in the soil and absence of sunshine are factors of great importance. It is to be observed that close settlement and extensive agricultural development is mainly restricted to land less than 500 feet above sea-level. Above this level, farms become infrequent, agricultural lands scarce, and moorlands the general rule.

Mineral Resources.—The total mineral resources of Northern Ireland are not known, though a number of different minerals are known to exist. Coalfields occur beneath the basalt rocks in the continuation of the Rift Valley. There is a proved coalfield to the immediate west of Lough Neagh, and another one is believed to exist in the neighbourhood of Larne. Also one has been proved to occupy a synclinal hollow in the old highland rocks in the neighbourhood of Ballycastle, and probably similar basins occur near Portrush. Actually, however, the present production of coal is negligible, and the quality of proved seams is poor; perhaps the greatest possibility for the future is the development of electricity from the powdered coal.

A belt of iron ore of wide extent occurs between the upper and lower series of basalt lavas, and these ores have been worked intermittently for many years. The ore (11,000 tons in 1927-28; 1,400 in 1932) was exported mainly to the iron furnaces of Barrow. Deposits of bauxite, the principal ore from which aluminium is obtained, are found in a position similar to that of the iron ore, below the upper layers of basalt. The bauxite beds vary from

two to six feet in thickness, but workings have been unimportant in recent years ; though between 1882 and 1918 the total output was nearly 300,000 tons, worth approximately £100,000.

Rock salt occurs in the Triassic beds north and north-west of Belfast Lough, in similar beds to those yielding the salt of Cheshire, and in recent years approximately 3,500 tons have been obtained. Various building stones and raw materials are quarried, notably chalk (which is used for burning into lime and for the manufacture of cement and whitening), basalt, and the granite of the Mourne Mountains. A particularly interesting mineral is that known as diatom earth or kieselguhr. This consists of the siliceous remains of tiny plants known as diatoms, which are laid down at the bottom of lakes or other stretches of inland water. The deposits occur over considerable areas of the alluvial flats of the Bann valley. Diatom earth is used for a large number of industrial purposes—in the manufacture of pottery, of bricks, fireproof materials for building, and during the Great War had an important use as an absorbent material. These deposits in Ireland are probably the largest in the British Empire, but in quality the material is not as good as the German kieselguhr. The principal workings in Northern Ireland are at Toome Bridge, Newferry, and Portglenone (all on the River Bann, north of Lough Neagh).

Agriculture in Northern Ireland.—The following table shows the relative importance of mining, agriculture, fisheries, and manufactures in Northern Ireland.

Industry	Number of persons employed in 1926	Value of output in 1925
Mining	2,160	£276,000
Agriculture	148,000	£15,075,000
Fisheries	1,376	£100,000
Manufactures	294,000	£22,908,000*

It will be seen from this table that apart from the manufacturing industries associated with Belfast, Northern Ireland is essentially agricultural. More than two-thirds of the whole area is under crops and grass, but out of this only one-fifth, or 670,000 acres, are ploughed. On this ploughed land oats form by far the most important crop, occupying more than half the area. Northern Ireland, like the rest of the island, is too damp and too sunless for the really successful cultivation of wheat, and barley is of still less importance. But potatoes occupy, as in so many parts of Ireland, a large area.

Of very special interest in the agriculture of Northern Ireland

* Net output (i.e. value added by manufacture to raw materials used, 1924).

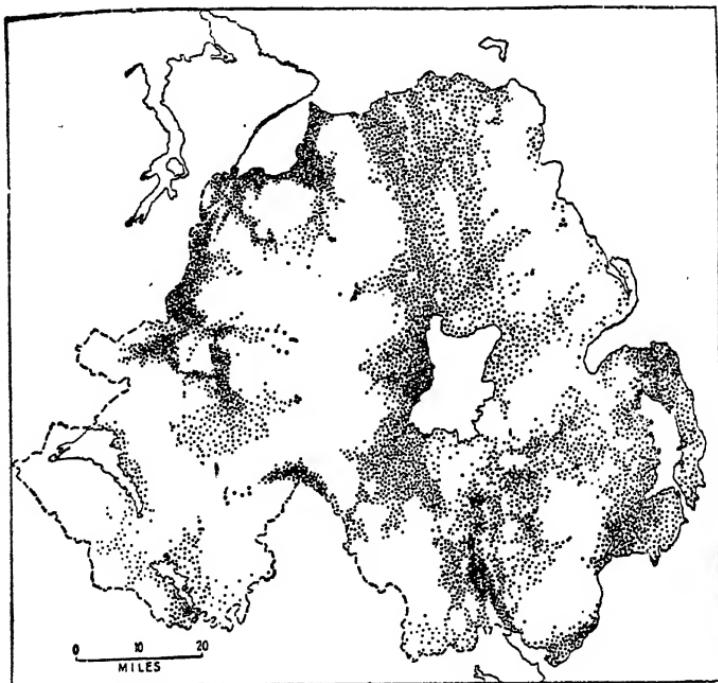


FIG. 121.—The distribution of oats in Northern Ireland.

The connection between the distribution shown in this map and in Fig. 122 with the natural regions shown in Fig. 120 should be carefully noted. Cultivation is most important in (a) the uplands of Co. Down; (b) the Lough Neagh basin; and (c) the Foyle strath.

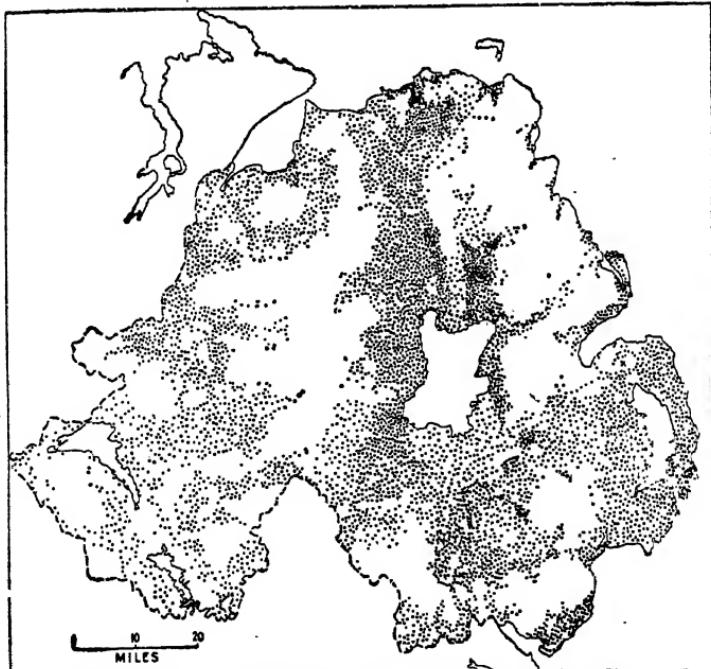


FIG. 122.—The distribution of potatoes in Northern Ireland.

is the cultivation of flax. Flax requires a well-drained, clean, heavy soil. The seeds are planted very closely, since the closer together the plants can be made to grow, the finer the stems and the better the fibre. The plant requires constant attention, several ploughings, hand weeding, etc. It is very exhausting to the soil, and is usually grown in a seven-year rotation with other crops: so that soil and labour are really more important than climate. The harvesting consists of pulling up the plants by the roots just before the seeds ripen. The first process of rippling consists of passing the stems through a comb of long teeth to get rid of any seeds.

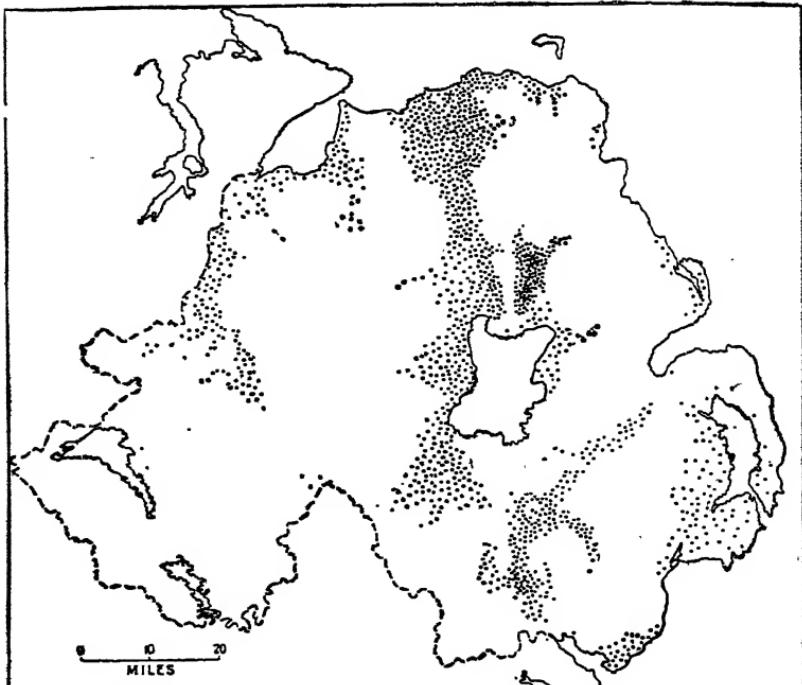


FIG. 123.—The distribution of flax in Ireland—mainly in the Lough Neagh basin.

The useful fibres are arranged as bundles round the central woody core; the process of retting, performed by standing the flax upright in soft water for two weeks, rots the soft tissue and allows the separation of the fibres from the woody core. The latter is broken by the whole being passed through heavy rollers, and the fragments are then beaten out (scutching), leaving the flax fibres ready to be combed (heckling). The fibres are very long, fine, and supple; they are made up into 14-lb. bales for market. Flax is the fourth most important textile material after cotton, wool, and silk, and is used where strength and durability are required. The linen industry is important particularly in Belfast, but the flax crop occupies a

dwindling area in Northern Ireland, and has decreased in recent years from 33,000 acres in 1923-24 to 9,800 acres in 1933.

Occupying a larger area than any of the crops already mentioned is the grassland used for hay, and this is a clue to the leading branch of agriculture in Ireland—the livestock industry. Her mild climate and her extensive pasture land enable cattle to be reared in the open during the greater part of the year, and have made Northern Ireland a great livestock country. Alongside the livestock industry is the production of butter, bacon and hams, eggs and poultry. A number of co-operative creameries exist for the production of butter from

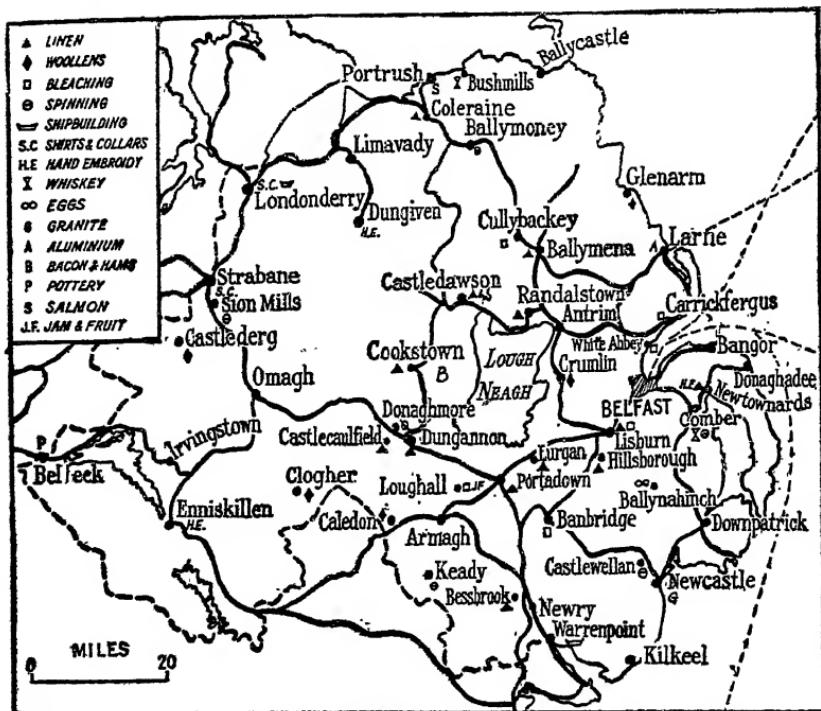


FIG. 124.—Towns, communications, and industries of Northern Ireland.

NOTE.—No attempt is made to show the numerous industries of Belfast.

milk received from farmers, and after the cream has been separated the skimmed milk is returned to the farmers to be used in rearing calves and pigs. In addition to supplying the needs of the home population, the industry has a large exportable surplus of livestock, eggs, and bacon, which is sent mainly to Great Britain.

Fisheries.—Northern Ireland has interesting inland fisheries, including salmon in the Foyle and the Bann and in Lough Neagh. Of the sea fisheries, herrings form the most important part of the catch, and large quantities are pickled during the summer season at Ardglass and Kilkeel for export to the Continent.

Industries.—Northern Ireland has four principal industrial areas, of which the first is by far the most important.

(1) *Belfast and District.*—Here the main industries are the manufacture of linen, ship-building, engineering, rope-making, and distilling. The port of Belfast forms the main channel for the import and export trade of the country.

(2) *The Lagan Valley* and the country south of Lough Neagh have several centres in which linen is manufactured. In all, linen is the principal industry in Northern Ireland, and employs, directly or through subsidiary trades, over 100,000 workers. The engineering industry of Belfast and district is closely allied to the linen and shipbuilding trades, in which machinery of all kinds plays a leading part.

(3) *The City of Londonderry and District*, where the chief industries are the manufacture of such made-up goods as shirts and collars; Londonderry itself is the second port of Northern Ireland.

(4) *The Hinterland of the Port of Newry*, where again linen manufacture is carried on, and also the manufacture of a limited amount of woollen goods.

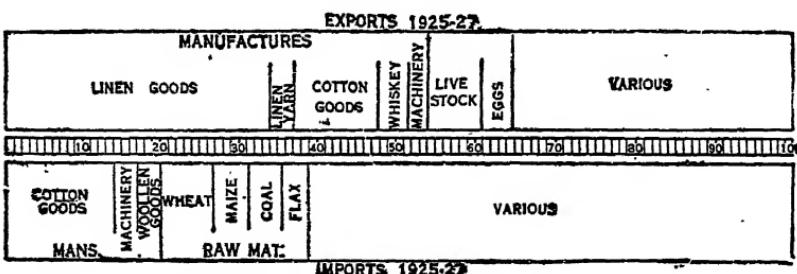


FIG. 125.—The exports and imports of Northern Ireland.

The years which this diagram covers were bad years for the shipbuilding industry, and so the items shown do not entirely agree with the "normal" items, especially exports, mentioned in the text.

The Trade of Northern Ireland.—Excluding the trade with the Irish Free State, the trade of Northern Ireland has a value, in which imports and exports roughly equal one another, of approximately £18,000,000 a year. Food and drink make up a quarter of the exports, the principal items in order being: livestock, eggs and poultry, butter, bacon, potatoes. This proportion includes the one-third of the total in which live animals, mainly cattle for food, are included; whilst practically all the remainder of the exports, two-thirds of the whole, consist of articles wholly or mainly manufactured. In normal years linen goods make up half this total of manufactured goods, that is to say, roughly a third of all the exports of Northern Ireland; the second place is occupied by ships built and repaired. Other items worthy of note are shown in the diagram, which also illustrates the character of the import trade.

The imports are varied, but a third comprises food and drink. Amongst these the import of wheat and flour for human consumption and of maize for animal consumption is interesting; whilst a considerable import of coal represents one of the great needs of Northern Ireland, though the biggest item is actually that of cotton goods.

Transport and Communications.—Maps have been drawn to show the principal ports of Northern Ireland, and the communications by means of railways. The port of Belfast really serves the whole area, though some of the trade of the north is taken



FIG. 126.—The population and market towns of Northern Ireland.

Figures in brackets show the population to the nearest thousand. Towns of over 10,000 are shown by squares; between 5,000 and 10,000 by circles; with less than 5,000 by triangles.

by Londonderry, some of that of the southern part of Lough Neagh basin by Newry, and some of that of the northern part of that basin by Coleraine. There are a number of small fishing harbours round the coast, but only Larne has been developed as a modern passenger port, apart from Belfast. Mention may here be made of the proposals which have been put forward for utilizing the fall of the river Bann from Lough Neagh to the sea for the generation of electric power. The scheme for the improvement of the drainage of the valley which will prevent the flooding of Lough Neagh goes hand in hand with the electrification scheme, but the work at

present in hand is essentially for drainage, and Northern Ireland may instead buy electric power from the Free State.

It has already been pointed out that one may distinguish between the urban and rural population of Northern Ireland, and that the rural population is essentially scattered. An attempt has been made in the map to show the distribution of the population, and to illustrate the position of market towns and of the areas which they serve. In recent years a very important part has been played by motor transport in linking up what were formerly very much isolated centres.

Irish Free State (Eire)

The whole of southern Ireland formed itself into a republic in January, 1919, but the present status of the Irish Free State was determined by a treaty signed with Great Britain in December, 1921. The Irish Free State comprises the twenty-six southern counties of Ireland, and has the same position in the British Empire as the self-governing Dominions of Canada, Australia, and New Zealand. Although English is the language spoken almost everywhere in Ireland, the distinctive Irish or Erse language has been revived, and so the Irish Free State is known officially as Eire. Excluding the larger rivers and lakes, the Free State has an area of 17,000,000 acres, and a population in 1936 of 2,966,000. It is thus roughly five times as extensive as Northern Ireland, but has only a little over twice as many people. The capital, Dublin, has a population of 317,000, and is an important manufacturing centre. Cork, with 78,000 inhabitants, is the only other town with more than 50,000 people.

Physical Features and Structure.¹—The oft-repeated assertion that Ireland is shaped like a saucer with a central plain and a rim of mountains rather blinds one to the very irregular character of the mountain rim, and to the fact that the central plain itself is interrupted by numerous ranges or isolated masses of hill country. Primarily one may distinguish :

- (1) The Central Plain.
- (2) The uplands of the north-east, which have already been considered under Northern Ireland, but which extend into the Free State.
- (3) The mountains and uplands of the south-east (Wicklow and Wexford).
- (4) The parallel ranges and valleys of the south-west.
- (5) The mountains of the north-west, which also extend into Northern Ireland.

¹ This scheme of division of Ireland into natural regions is here published for the first time; it is elaborated in Stamp and Beaver's "British Isles." See also Stamp's "Agricultural Atlas of Ireland."

Each of these main divisions must now be considered in somewhat more detail.

The Central Plain.—On a geological map the Central Plain appears as a broad sweep of limestone interrupted at intervals by basins of younger coal measures and sandstone or by inliers of older Old Red Sandstone, usually giving rise to hills. Actually, however, one rarely sees the limestone which underlies the Central Plain. It is masked by a spread of glacial and later deposits. From what

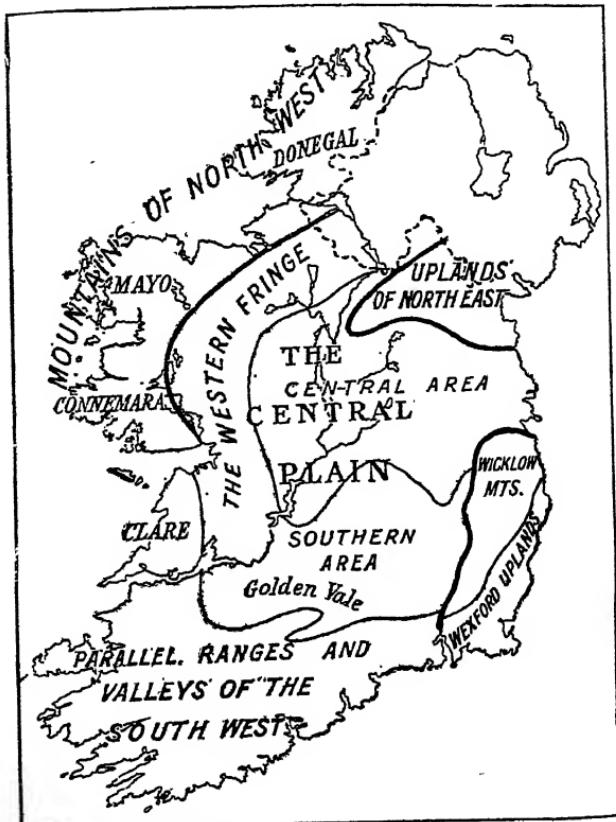


FIG. 127.—The natural regions of the Irish Free State.

has already been said of such deposits in the North European Plain, it follows that one finds in Ireland stretches of still water-logged boulder clay, stretches of coarse sands forming undulating country, and stretches of comparatively fertile loam. On a low-lying area of such a character, drainage is naturally bad; it is rendered worse by the presence of the limestone below. Water tends to pass irregularly through the fissures in the limestone rather than across the surface by regular watercourses. The curse of the Central Plain is thus bad drainage, with the consequent formation of huge

bogs ; the most useful land is frequently the undulating sandy country, though here the soil is but poor. The following division of the Central Plain into four is generalized rather than clear cut :

(a) The western fringe. This consists of well-drained "drumlin" and limestone country. Drumlins are mounds of sandy material of glacial origin. Such country is marked (in eastern Galway and Roscommon) by the importance of sheep pastures on the well-drained land, and by the importance of dairy cattle, potatoes, or oats in the tract stretching from Galway (town) through Mayo (with Castlebar as a centre) to the coast of Sligo Bay at Ballina and Killala. In Clew Bay the drumlin country reaches the coast, and where "drowned" a multitude of low islets is the result.

(b) The limestone uplands of County Clare. This is a typical limestone area with few glacial deposits.

(c) The central area. This is the country of the great bogs, reaching the Irish Sea between Dublin and Dundalk. This is essentially a land of wet pastures where little cultivation is possible, but where beef cattle and horses (ready for export from the port of Dublin) are especially in evidence. Sheep become numerous on the better drained ridges between the bogs.

(d) The southern area. Here, drainage is better : hills are numerous, and it is possible to distinguish between the hills, with their rather poor pastures, and the valleys where much cultivation is possible. In these valleys, such as those of Leix and Kildare, potatoes, mangels, and oats are grown, and, as this tract is near the sunnier, drier regions of south-eastern Ireland, barley also.

The Uplands of the North-east.—Although again largely masked by glacial deposits, drainage is better, bogs become infrequent, and, as in the neighbouring parts of Northern Ireland, there are rich pastures, more accessible than those amongst the bogs, and so giving rise to a dairy-cattle, potato and pig country.

The Mountains and Uplands of the South-east.—This well-marked area was doubtless once continuous with North and Central Wales, and is structurally similar, except for the presence of a huge granitic intrusion. The latter gives rise to the Wicklow Mountains, and there is a clear two-fold division of the whole area into the Wicklow Mountains and the Wexford Uplands.

(a) The Wicklow Mountains, reaching northwards almost to the outskirts of Dublin, are remarkable, first for the marked barrier which they form between the Irish Sea and the Central Plain, and secondly for the contrast between the deep, secluded valleys and the wide open moorlands of the higher parts. Agriculture is restricted to the valleys, where there is also much afforestation. The mountain slopes afford sheep pastures.

(b) The Wexford Uplands are remarkable for the comparative absence of glacial deposits, and for their situation in the corner of

Ireland which has relatively dry, warm summers. The old rocks furnish a moderately good soil, so that here is *par excellence* the barley-wheat region of the country, where potatoes and pigs are also important.

The Parallel Ranges and Valleys of the South-west.—South-western Ireland owes its present structure mainly to the Armorican series of earth movements, which have resulted in a series of folds trending from east-north-east to west-south-west. There are lofty, barren ridges of Old Red Sandstone, separated by fertile valleys of Carboniferous Limestone. Where the country reaches the sea in the west, the valleys are invaded by the oceanic waters, and form long, narrow rias. The climate is particularly mild and this is pre-eminently the dairy-farming area of Ireland, with a network of co-operative dairies. Oats flourish to the sheltered south; sheep are numerous on the hill pastures. Pigs are especially numerous—notably near the bacon centres of Limerick, Cork, and Waterford. The broadest and most fertile of all the valleys is the northernmost one, running through Tipperary and Limerick and world-famous as the "Golden Vale," renowned especially for its dairy cattle. It really forms part of the southern belt of Central Ireland (Fig. 127).

The Mountains of the North-west.—These mountains are built up of the same ancient metamorphic rocks as those which make up the Highlands of Scotland. There are really three separate areas—Connemara, Mayo, and Donegal. This part of Ireland is exposed to the full force of the rain-bearing winds from the ocean. Large areas are so bleak as to be uninhabitable; there are huge tracts occupied by boggy moorland. Sheep live on the well-drained slopes, but potatoes and oats are almost the only crops possible in the lowlands. The small population exists in the valleys only, or is occupied in fishing along the coasts. The local sheep furnish the raw material for the famous Irish and Donegal tweeds.

Climate.—It is scarcely necessary to add to what has already been said regarding the climate of Ireland. A large part of the country suffers from excessive rainfall; everywhere rainfall is at least adequate, and the great need almost everywhere is drainage. The importance of summer warmth (July isotherm over 60° F.), and summer sunshine is especially well seen in the distribution of barley.

Agriculture.—Ireland is pre-eminently an agricultural country, and some idea of the relative importance of agriculture and other occupations may be gained from the following table, showing the value of the total output.

	Value of output £
*Agricultural produce (1926-7)	64,750,000
Fisheries (1927), approx. : : : : :	1,100,000
All manufactures (1926)	24,190,000

In the above table it will be noticed that the value of all manufactures is the net output value, that is, the value added during the process of manufacture to the cost of the original raw material.

Broadly speaking, the very damp though mild climate of Ireland favours pastoral farming throughout rather than arable farming. The mildness of the winters permits cattle to feed outdoors throughout the year, while the dampness of the summer does not, as a whole, favour the ripening of crops. It is not surprising, therefore, to find

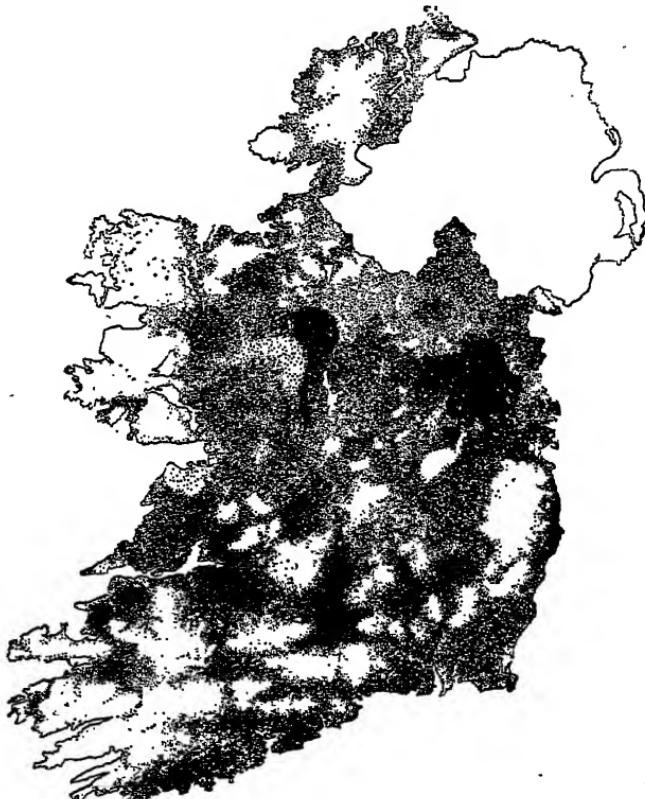


FIG. 128.—The distribution of beef cattle in the Irish Free State.
(For explanation, see text.)

that permanent pasture occupies nearly half the surface of the whole country, and that if one adds to this the area of mountain-sides which can be used as grazing lands, and the area occupied by the principal crop, hay, which is of course grown essentially for food for animals, one finds that roughly three-quarters of the whole area of the country is really devoted to the rearing of animals.

Six groups of animals of importance may be distinguished: beef cattle, dairy cattle, sheep, horses, pigs, and poultry. Of these, cattle to the number of over 4,000,000 are the most numerous.

Three-quarters of these cattle are beef cattle, and the map shows the way in which they tend to be concentrated to a remarkable degree on the Central Plain. The reason is mainly geographical, and not very difficult to see. Cattle flourish on the rich pastures of the Central Plain, but communications in the midst of this land of great bogs are difficult, so the bringing in and milking of dairy cattle night and morning, and the regular daily collection of the milk which is essential for a successful dairy-farming industry, are

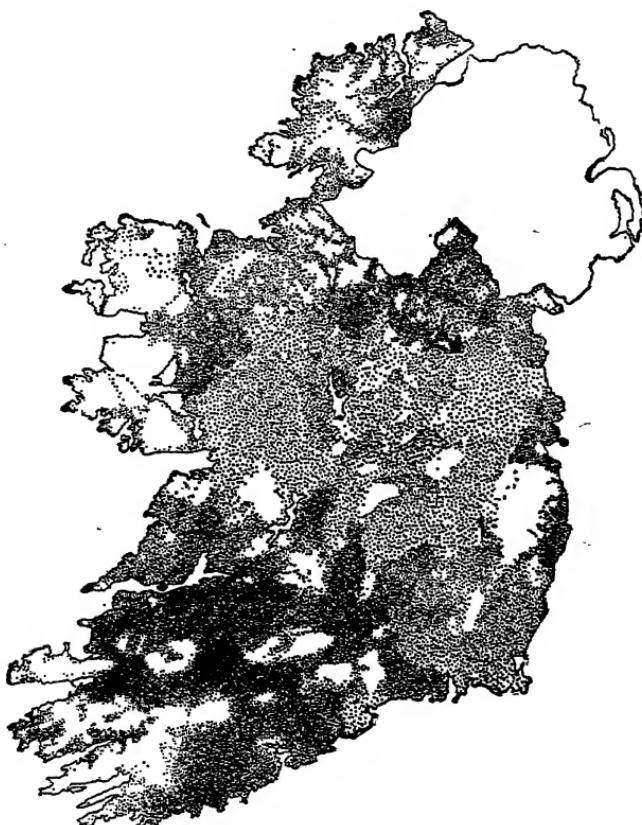


FIG. 129.—The distribution of dairy cattle in the Irish Free State.
(For explanation, see text.)

difficult from this point of view alone. Hence there is comparatively little dairy-farming in the Central Plain, and concentration there is on the production of cattle for beef, and reference will be made later to the enormous export of live cattle from the port of Dublin, mainly to Great Britain. In the fertile valleys of the south west, where bogs are almost absent but where one has rich pastures, dairy-farming is much more important, and its success is very largely the result of the co-operative system. The individual

farmers take their milk daily to the creameries, where the cream is separated and made into butter. The farmers take back the skimmed milk for feeding to their young stock or to their pigs, and they share in the profits of the creamery.

Pigs and poultry are more essentially "domestic" animals. One does not find huge pig farms or poultry farms developed as such; instead, each farmer has a few pigs and a number of poultry, which can be kept and reared satisfactorily on what might otherwise

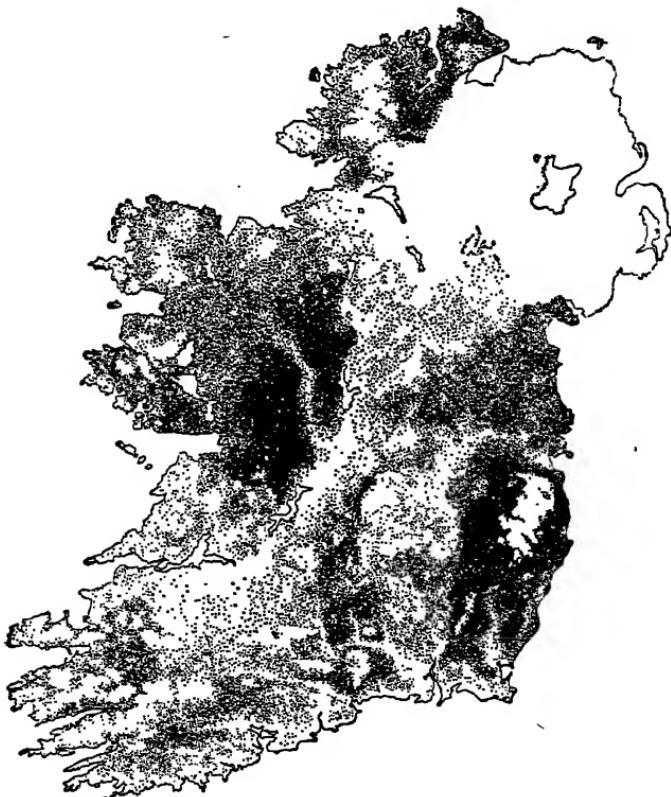


FIG. 130.—Sheep in the Irish Free State. (For explanation, see text.)

be almost waste products. The skim milk is fed to the pigs, and so we get Irish bacon of good quality—so good that there is actually an import into Ireland of inferior quality bacon. Whilst, therefore, a map showing the distribution of pigs in Ireland bears many resemblances to a map of population, it is otherwise with the sheep. Sheep must have well-drained pastures. The actual amount of rainfall in the country does not matter greatly, provided that the rain can run off; so one finds the sheep of Ireland concentrated on the mountainous areas and the comparatively dry hill-slopes. This

explains the enormous numbers on the slopes of the Wicklow mountains in the east, and the large numbers on the mountain slopes of Donegal and Kerry as well as the very large numbers on the sandy drumlins and limestone of the western fringe (pp. 161-2). The manufacture of home-spun tweeds is not by any means dead in Ireland.

Turning to the crops of the Irish Free State, the influence of the geographical factors is particularly well shown. The area devoted to wheat decreased steadily for many years to 21,000 acres in 1932,

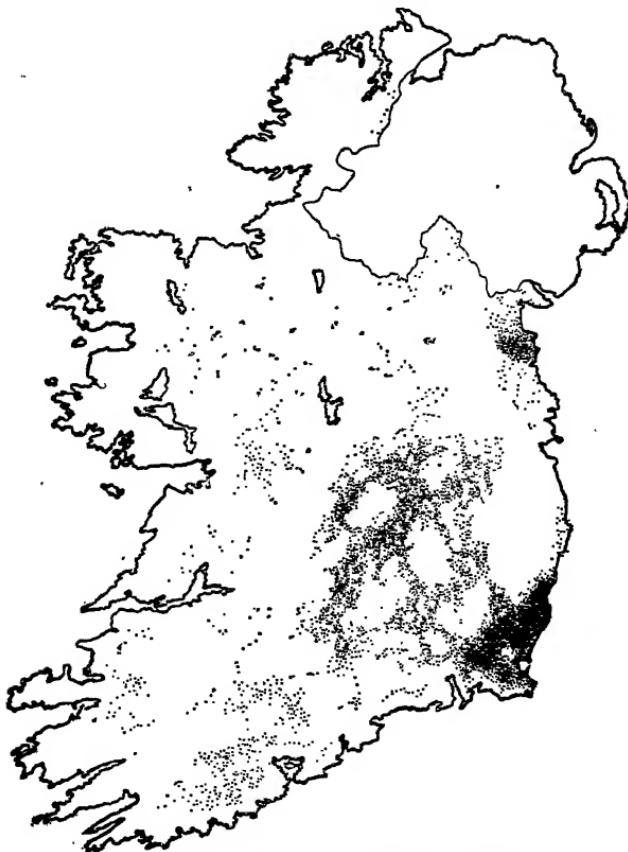


FIG. 131.—Barley in the Irish Free State.

but is now increasing under Government protection. It is the opinion of some experts, however, that there is little or no advantage in attempting to increase the area under wheat in Ireland, as the damp climate renders this crop particularly liable to disease. But in the Irish Free State nearly two-thirds of a million acres are devoted to oats; and one finds oats ripening even in the extreme west. Barley, on the other hand, important because of local brewing and distilling industries, is almost entirely restricted to the

drier, sunnier, and warmer-summered regions of the south-east. An important food crop which can be cultivated where almost all others fail is the potato, which accordingly occupies over 300,000 acres in the Irish Free State. Another root crop, mangels, is important, and sugar beet has recently been introduced into the Free State and is cultivated especially in the valley of the Barrow and in the south-east.

Fisheries.—The network of lakes and inland waterways in the Irish Free State provide very important fishing grounds, including perhaps some of the finest salmon and trout fishing in the world. The value of freshwater fish captured in Ireland year by year is not always properly appreciated. The value of salmon alone must exceed a quarter of a million pounds sterling. In addition, some £200,000 represents the value of sea fish and shell fish.

Mining.—The minerals of the Irish Free State are comparatively unimportant. Although a geological map shows several areas of

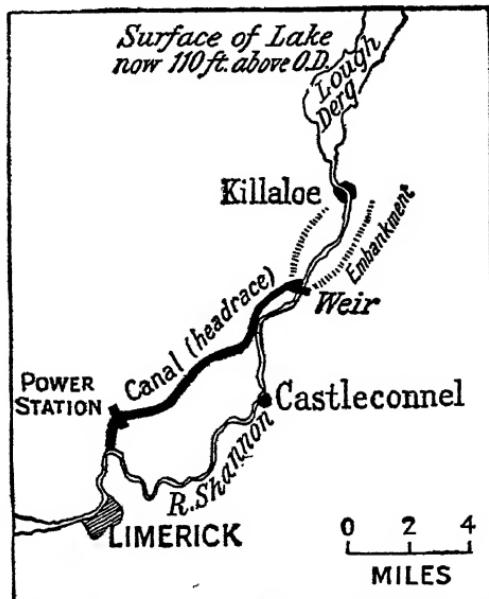


FIG. 132.—Details of the Shannon hydro-electric scheme.

coal measures, the coal seams and coalfields in them are unimportant, and practically all the coal required has to be imported. Building materials and road metals are quarried or mined, and include limestone, igneous rock, gravel, sandstone, etc., but there are practically no workings for metalliferous minerals at the present time. The absence of coal was naturally a very great incentive to the development of water-power, and the Irish Free State early in its history undertook what is known as the Shannon Power Scheme

—one of the most comprehensive power schemes in the world. Between Lough Derg and the tidal limit at Limerick the river Shannon passes through a series of rapids, so that the total fall from the lake to the sea is over 100 feet. The scheme was to build a dam which would increase the size of the lake and maintain its level at

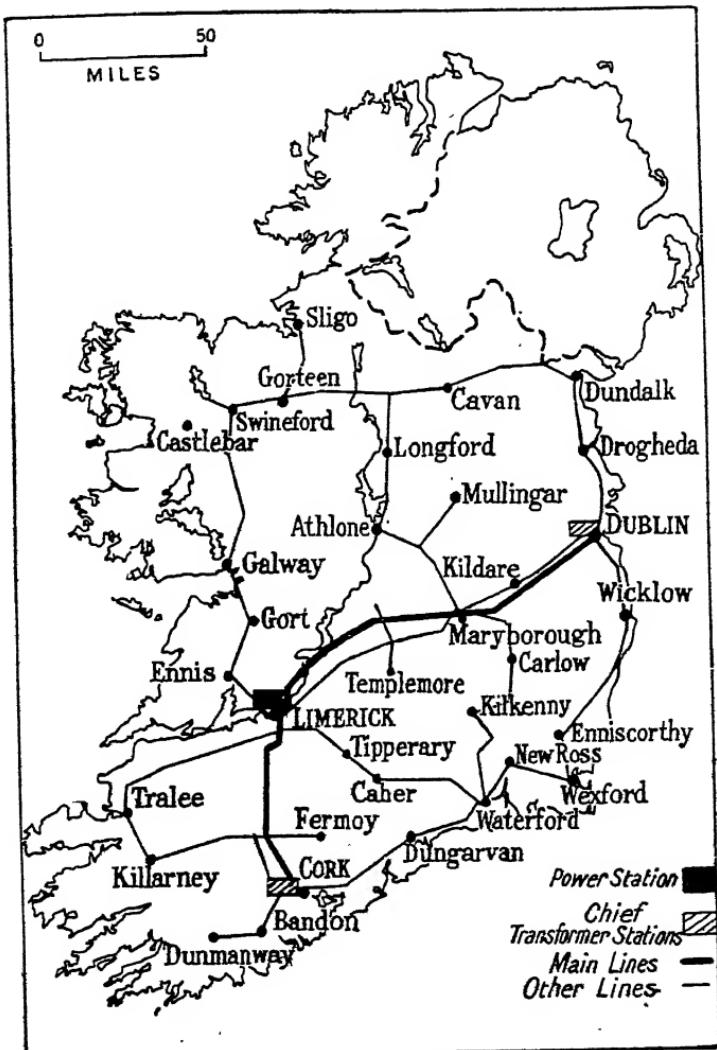


FIG. 133.—The Shannon power scheme.

a permanent height, then to conduct the water through a long canal, utilize the fall of water for power works some distance above the town of Limerick, and then allow the water to escape to its old channel. The power so generated is conducted by overhead lines to practically all parts of the Free State, and sufficient elec-

tricity will be generated not only to light the whole of the Free State and to run its existing industries, but also to make possible the development of new industries. The project is being carried out in two parts; half of the scheme was completed in October 1929, and at present roughly half of the total power available is being generated.

Manufactures.—Manufactures in the Irish Free State are concerned primarily with the utilization of the agricultural products of the country. Thus from the point of view of the value of the products, the two leading industries are brewing and the preparation of butter, cheese, and margarine. Nearly all Ireland's home-grown barley goes to supply the brewing industry, and there is a considerable import of barley in addition. The famous St. James' Gate brewery, where Guinness's stout is made, is situated in Dublin, and is the largest brewery in the world. It employs no less than 3,000 people, and with wives and families it may therefore be said to support no less than 12,000 people. Annually this brewery alone uses no less than 2,000,000 bushels of barley and the hops grown on 5,000 acres of land, and produces 100,000,000 gallons or 400,000,000 quart bottles of Guinness's stout.

Bacon-curing is another characteristic industry, notably important in Cork, Limerick, Waterford, and Wexford. If we include flour-milling and biscuit-making together, we have another very important industry, and one which again employs large numbers of the inhabitants of Dublin. The manufacture of woollens, clothing, boots and shoes, furniture, etc., has been greatly stimulated in the last few years under the Government policy which aims at making the country economically self-sufficient.

Distribution of Population.—In contrast to Great Britain the distribution of population in Ireland has two outstanding characteristics. The first is the large proportion of the population, which is rural; the second is that the population has, on the whole, been steadily decreasing for the last fifty years. In 1835 the total population of the whole of Ireland was probably over 8,000,000, and the rapid increase up to that time had really been made possible by the growth in the use of the potato, which was introduced early in the seventeenth century. The country has really never recovered from the terrible famine of 1846-8. In 1851 the population had fallen to 6½ million, and from 1847 onwards there has been an enormous emigration from Ireland. Between 1851 and 1905 about 4 million emigrants left Ireland, going very largely to the United States of America. After all, there is not the contrast between Ireland and Great Britain that there would seem to be at first sight. One must remember that in the purely agricultural parts of Britain, such as many of the counties of Wales, the population has been decreasing; and this indeed is true of other rural areas in Britain. And when one remembers that Ireland is almost

entirely rural and less favoured climatically than Britain, the decreasing population is scarcely surprising. When one realises that Ireland has developed important industries and has not had

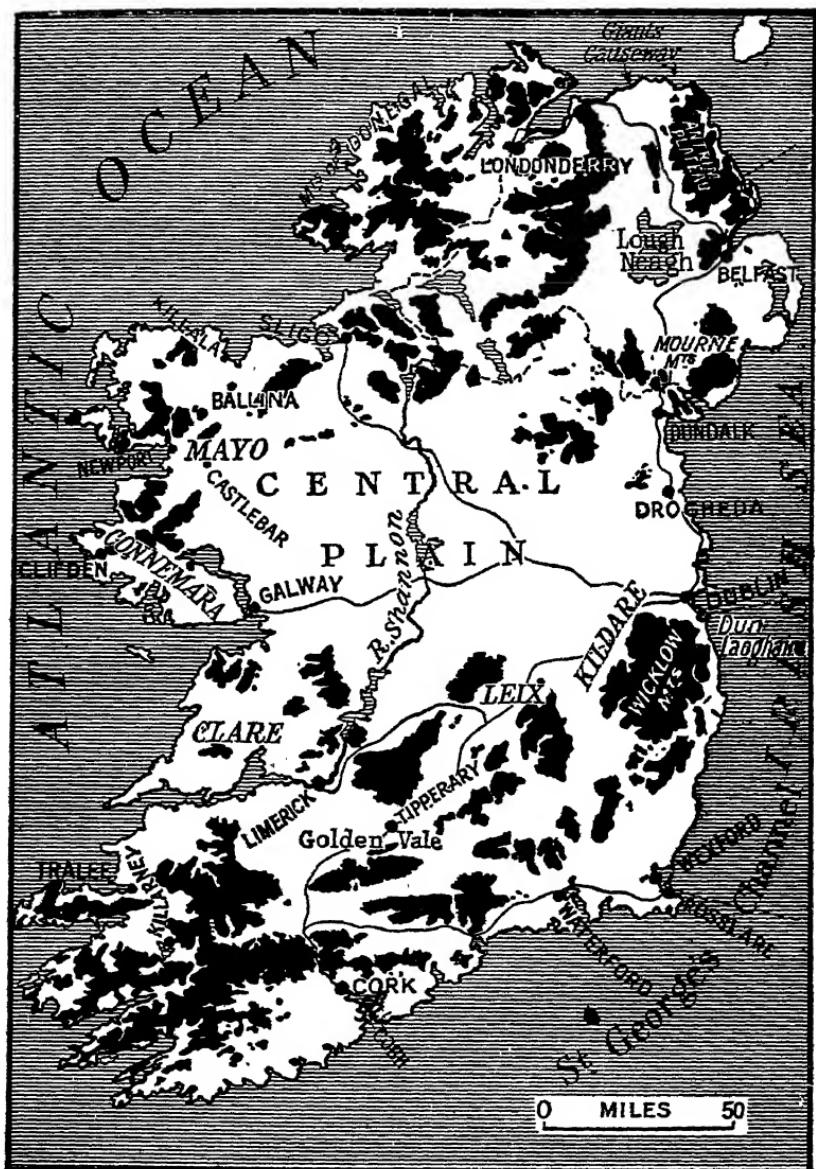


FIG. 134.—Map of Ireland showing chief towns. Land over 500 feet; black.

the resources of coal for power that Britain has, it seems that much may be done in the Irish Free State to improve agricultural conditions and increase the population, whilst the electrification of the

country is doing a great deal towards the increase of manufactures. When one travels about Ireland, it strikes one as most curious at first to notice the large number of deserted buildings, instead of the immense number of new dwellings only too evident in England. This position has now been reversed and the population is increasing rapidly.

With few exceptions the largest towns in Ireland are ports. The inland towns really act as market centres for the rural area around. By far the most important is, of course, the great capital and port of Dublin. Much has been written about the importance of the site of Dublin, situated as it is where the mountain rim of



FIG. 135.—The railways and railway systems of Ireland.

Ireland is breached, where there is a good sheltered bay between two headlands and a navigable river mouth, and where there is ease of communication with all parts of the Central Plain, and, indeed, with all parts of Ireland. Moreover, Dublin on the east coast faces Britain, and it is in this direction that English influence has penetrated in the past, and it is towards England that Ireland exports by far the major part of her agricultural produce. The railways of Ireland radiate from Dublin to all parts of the country, and Dublin has the further advantage of an outport used by the mail steamers in Dun Laoghaire, formerly known as Kingstown.

Of the other routes from Britain to the Irish Free State, the most important is that from the Great Western Railway port of Fishguard in Wales to Rosslare near Wexford in the south-eastern corner of Ireland. From Rosslare there is excellent communication with all the southern and south-western parts of Ireland, including that favourite holiday resort so far famed for its wonderful scenery, Killarney. Wexford itself is a port that has rather been left behind at the present day. The smaller Irish ports are often of very considerable interest, for whereas the export of live animals and agricultural produce is more conveniently sent from Dublin than any other port, it must be remembered that a leading import into Ireland is coal; and it is usually an advantage to land the coal, as well as other classes of imports, as near as possible to the centre of consumption. And so there is usually a considerable import trade of coal at all the smaller ports, together with an import of other materials, such as maize for the pig-rearing industry at Cork, a trade which is scarcely balanced by the comparatively small exports. Along the south coast one finds the two ports which, excluding mail and passenger traffic, may be regarded as following after Dublin in importance—namely, Cork and Waterford. On an island in the large Cork harbour is Cobh, formerly known as Queenstown, which is used as a port of call for many of the Atlantic liners on their way from Britain to North America, though the significance of Cobh as an import or export port for merchandise is small.

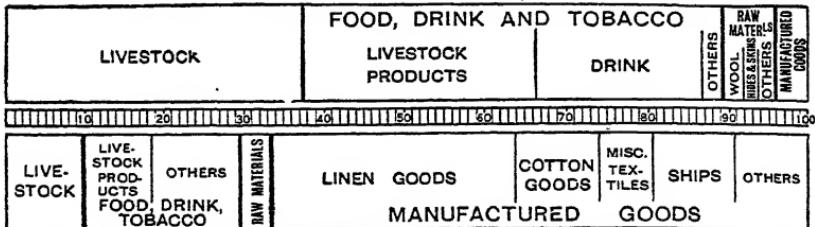
On the west coast the four chief ports are situated on the three bays which break through the mountain rim of the country. There is Limerick at the mouth of the Shannon, where nearly all the vessels arrive with cargo and often leave without, and Tralee, further out in the bay. Galway, on Galway Bay, sometimes referred to as the capital of the west, has many features of interest to the geographer. Galway faces America, the home of so many of the Irish who have emigrated, and one feels that whereas Dublin is not only facing eastwards, but is looking eastwards, Galway not only faces west, but is looking westwards. There is, indeed, a direct link between Galway and the New World in the form of direct trans-Atlantic communication. Further north is Sligo on Sligo Bay.

Foreign Trade.—The best idea of the foreign trade of the Irish Free State may be gained by studying the diagrams, Figs. 136 and 137. This shows at once the overwhelming importance of exports of agricultural origin, and stresses the fact that more than a quarter in value of the whole exports of the Irish Free State is formed by live cattle. In this respect Ireland is unique. The establishment in Ireland of local works of the Ford company has not only affected the character of motor vehicles and tractors, which are so important in Ireland, but is also shown by an export, which started in 1929,

of tractors. The only other manufactured goods exported to reach the value of over £250,000 annually are biscuits.

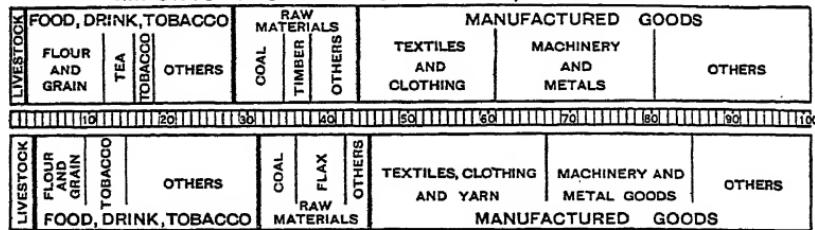
The imports into Ireland bring out, of course, the dependence of the country on foreign supplies of coal and of practically all

EXPORTS - IRISH FREE STATE. 1935, £19·9 MILLION



EXPORTS - NORTHERN IRELAND. 1935, £45 MILLION

IMPORTS - IRISH FREE STATE. 1935, £37·5 MILLION



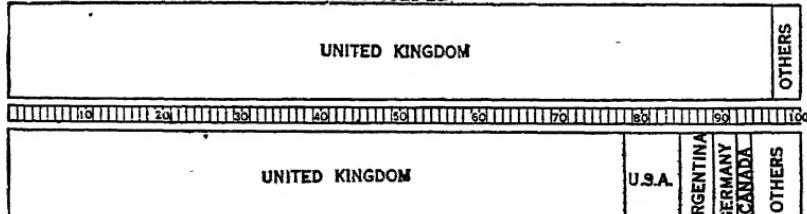
IMPORTS - NORTHERN IRELAND. 1935, £47·1 MILLION

FIG. 136.—The trade of the Irish Free State and Northern Ireland compared.

The horses exported (included under "live animals," otherwise mainly cattle) are the Irish hunters and racehorses for which the Kildare country west of Dublin is specially famous.

manufactured goods; as well as the dependence of the country, as is true also of the United Kingdom, on foreign supplies of the essential food-stuff wheat. Three special aspects of the foreign trade of the Irish Free State should be noticed.

EXPORTS 1925-28



IMPORTS 1925-28

FIG. 137.—The direction of trade of the Irish Free State.

In the first place, the Free State sells various commodities, particularly to Great Britain, whilst Great Britain supplies manufactured articles which cannot be made in Ireland. It is not surprising, therefore, to see that the Irish Free State in 1934 sold 95 per

cent. of all its exports to Great Britain and Northern Ireland, and purchased 67 per cent. of all its requirements from the same source.

The very large drop in the export trade up to 1937 of the Irish Free State was due in part to the dispute with Great Britain, now settled, which led to the institution of heavy import duties by Britain.

The second point is that in the supply of agricultural products to Britain, the Irish Free State has a great rivalry with Denmark; nearly 60 per cent. of all Denmark's exports go to Britain. But, in the third place, the contrast with Denmark is interesting. Whereas Ireland's leading export is live cattle, Denmark specializes in butter and bacon. An interesting geographical comparison can be made between the Irish Free State and Denmark, both countries hampered to some extent by natural geographical conditions—Ireland by too much rainfall and a poor drainage, and Denmark by a poor soil. Denmark has achieved success in her dairy-farming industry largely as the result of carefully planned co-operation of the small farmers. Ireland is treading the same path as far as her dairy-farming industry in the south-west is concerned. But Ireland has, on the whole, a long way to go before she catches up with the economic prosperity of Denmark, though no reasons really exist why she should not make such progress.

SECTION III

THE COUNTRIES OF CONTINENTAL EUROPE AND THE MEDITERRANEAN

THE COUNTRIES OF FENNOSCANDIA

IN the earlier part of this book we have described Fennoscandia as a block of ancient rocks situated in the north of Europe to the north of the great plain, and corresponding approximately with the countries of Norway, Sweden, and Finland. When we come to delimit the area in some detail, it is not quite so easy. If we take the limits of the great spread of ancient crystalline rocks, then Fennoscandia may include the three countries with the exception of the extreme south-west of Sweden and the islands of Oland and Gotland. Actually, however, there are many ways in which southern Sweden, that is south of the latitude of Stockholm, differs from the rest of the tract. North of this latitude Fennoscandia consists of mountains, uplands, or plateaus, the whole once ice-covered and deprived of the greater part of its soil, for the bare rock is exposed over large areas and superficial deposits are limited to small areas. Southern Sweden, on the other hand, has closer affinities with the great European Plain in that here there are marked tracts of glacial deposits, though not so thick as to entirely hide the underlying rock. Another grouping of the countries of northern Europe is to group the Scandinavian countries together, Denmark, Norway, and Sweden. Denmark in its physical characteristics is essentially part of the North European Plain, but in its people, languages, and political affinities it is similar to Norway and Sweden. From 1350 to 1814 Norway had the same ruler as Denmark, but by a treaty in 1814 Norway was ceded to the King of Sweden by the King of Denmark. By a later treaty the two countries achieved their independence, but this independence only lasted a few months, and from 1814 to 1905 Norway and Sweden were under the same monarch. Denmark, Norway, and Sweden have thus been completely independent of one another only since 1905.

Certain aspects of the geography of Norway and Sweden or the Scandinavian Peninsula may conveniently be treated together. There are many points of resemblance between Scandinavia as a

whole and Scotland. Both have fiorded and island-dotted west coasts. In both the principal stretches of lowlands are to the south and east. The Scandinavian plateau of ancient rocks is deeply

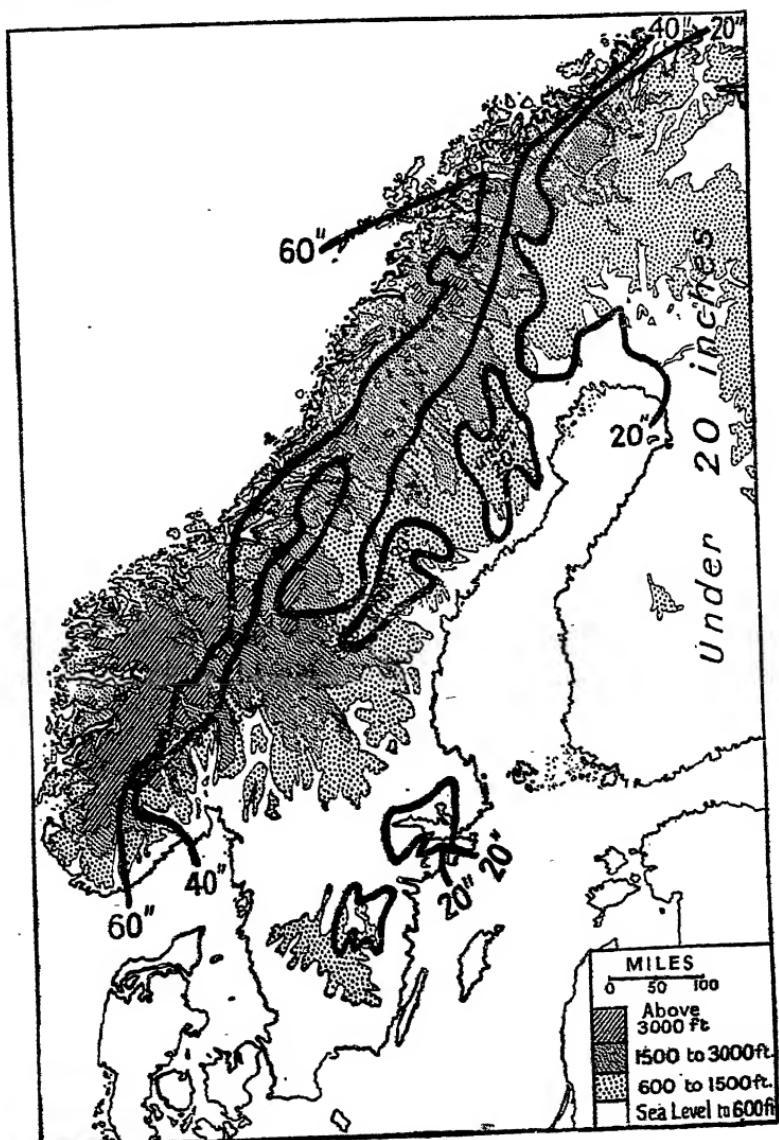


FIG. 138.—The relief and rainfall of Scandinavia.

(From Lyde's *Peninsular Europe*.)

dissected and furrowed by river valleys, but on the whole it is highest on the south-west and at no great distance from the Norwegian coast. Here large areas known as the Hardanger

Fjeld, the Jostedals Breen, the Jotunheimen Fjeld, and the Dovre Fjeld are over 6,000 feet above sea-level. The average elevation of the plateau decreases towards the north and towards the east; as a result nearly all the longest rivers flow eastwards, those of Sweden flow mainly into the Gulf of Bothnia or the Baltic Sea, but the eastward slope is by a series of steps rather than by a steady slope, so that in Sweden there are very large numbers of lakes situated at various elevations on these plateau steps. Towards the north the boundary between Norway and Sweden follows for a considerable distance the water parting, with the result that Norway occupies on the north a rather narrow strip between the water parting and the ocean, Sweden a much broader stretch to the east and south. Norway is much more mountainous than Sweden, so that notwithstanding the more temperate climate of Norway, the total area under crops and grass is only 4 per cent. of the surface, against 12 per cent. or more in

FORESTS	WASTE (MOUNTAINS ETC)	NORWAY
FORESTS	WASTE	CULT.

FIG. 139.—Uses to which land is put in Norway and Sweden.

Sweden. The question of climate is interesting : the whole of the coastal tract of Norway being above freezing in winter, whereas the whole of Sweden is in the grip of ice at least for one month in the year. Although little used for navigation, the rivers of both countries have become of increasing importance in recent years for purposes of water-power. In Norway two million horse-power are installed, in Sweden the installed horse-power are about 1,675,000. In Sweden, also, the longer streams make possible the exploitation of the forest resources of the country.

NORWAY

Norway has an area of about 125,000 square miles, and a population, according to the last census of 1930, of 2,815,000. Nearly three-quarters of the population are described as rural, these include 19,000 Lapps living in the tundra-like country of the north of Norway. As a whole one would be justified in describing Norway as a barren, mountainous country. The arable land is found in comparatively narrow strips in deep, narrow valleys or around the fiords and lakes. Large continuous tracts fit for cultivation do not exist, with the result that only 3·6 per cent. of the surface of the whole country is under cultivation—even so the bulk of the cultivated or cultivable land is situated in the comparatively broad

valleys around Oslo, and especially in the Glommen Valley. Travelling anywhere by railway in Norway one can see that elsewhere there are only isolated tracts of cultivation for pasture or for hay high up on the hillside. From time immemorial the pressure on the land has acted in Norway as an incentive to emigration and exploration. The Norwegians undoubtedly knew North America long before that continent was rediscovered by Columbus. Norwegians have settled in other lands, and there is still a large annual emigration. Nearly 12,000 people left the country, for example, in 1927, nearly all going to the United States and Canada. Over-crowding and the cultivation of the tiny tracts near the fiords drove the Norwegians to the sea, either to seek food and sustenance in fishing or to find new land possible for settlement. Consequently at the present day fisheries remain very important. Fish and fish products represent a quarter of the exports, particular fish being cod, herring, sardines, and mackerel. Whaling is still carried on extensively by Norwegians both in the northern seas and in the Antarctic. Another result of the pressure on the land and the call to the sea is found in Norway's large merchant navy, totalling two and a half million tons. Despite the small area of cultivable land, agriculture must be described as the leading occupation of the people. Hay occupies by far the largest area, followed by oats, barley, and potatoes. There are 1,200,000 cattle and 1,900,000 sheep and goats in the country. But the wealth of the country comes from the forests and not from the fields. The forests cover 24 per cent. of the country, and their products represent from a quarter to a third of the whole value of the exports. There is, however, no longer a large output of timber; wood-pulp and paper are far more important. The development of the paper-making industry has been made possible by the use of hydro-electric power. Water-power is by far the most important source of energy in Norway, and it is estimated that Norway has over 12,000,000 horse-power undeveloped. Apart from the pulp and paper industry, this power is used in the production of electro-metallurgical and electro-chemical products; among the latter are artificial fertilizers—ammonium nitrate, calcium nitrate, and sodium nitrate—as well as calcium carbide. Norway undoubtedly has extensive mineral deposits, but owing to difficulties of transport in such a mountainous country, they have not been much exploited in the past, but an improved output of pyrites and iron ore, which is smelted electrically, and the large output of aluminium in Norway are the result of hydro-electric power. In order of value, the electrically produced metals are aluminium, nickel, ferro-alloys, zinc, copper, pig-iron, and silver.

Oslo, formerly called Christiania, is the capital and largest town. Being situated at the head of one of the natural fiords, it has a fine

natural harbour, but round the head of the fiord are considerable tracts of flat land. Oslo exports timber, wood-pulp, and other products. *Bergen*, on the west coast, also exports timber, and is the centre of the fishing industry, as well as being a packet station for Britain. Further south is the fishing port of *Stavanger*. The most famous of Norway's fiords, visited annually by large numbers of tourists, lie near *Bergen*; but further north is *Nidaros*, now renamed *Trondheim*, which is the third port of Norway. Railway construction in a mountainous country like Norway is difficult. There are at least two famous mountain railways, the one which connects *Bergen* with the capital, and the one which connects the capital, *via* the *Dovre Fjeld*, with *Trondheim*. There is also another line from Oslo to *Trondheim* following the *Glommen Valley*. There are local lines in the south in the lower country round Oslo, and there is also a line from *Trondheim* across the divide into Sweden; further north there is only the line from the port of *Narvik*,

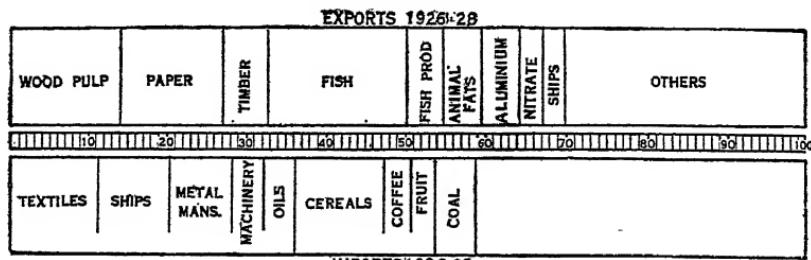


FIG. 140.—The trade of Norway.

which really serves the iron-mining district of Sweden. The northernmost point of Norway is North Cape, and not far south is the town of Hammerfest, famous as being the northernmost town of any size in the world. To the north of Norway lie the Arctic islands of Spitzbergen and Bear Island; they form the only foreign possessions of Norway,¹ and may be of some importance owing to the occurrence of coal. The output of coal at present is small.

SWEDEN

With an area of 173,000 square miles and a population of 6,100,000, Sweden is considerably larger and more densely populated than Norway. There is far less waste land; 12 per cent. of the total surface is cultivated, and forests cover no less than 60 per cent. of the whole. Sweden falls at once into two main divisions, the forested north and the agricultural, lowland south.

Although Sweden has always been an agricultural country, an

¹ Apart from a tiny island in the Southern Ocean used as a base for whale fisheries.

increasing percentage of the population—now nearly half—is engaged in occupations other than agriculture. The principal crops are oats, rye, barley, and wheat among cereals; potatoes and sugar-beet among root crops; but fodder crops and hay occupy as

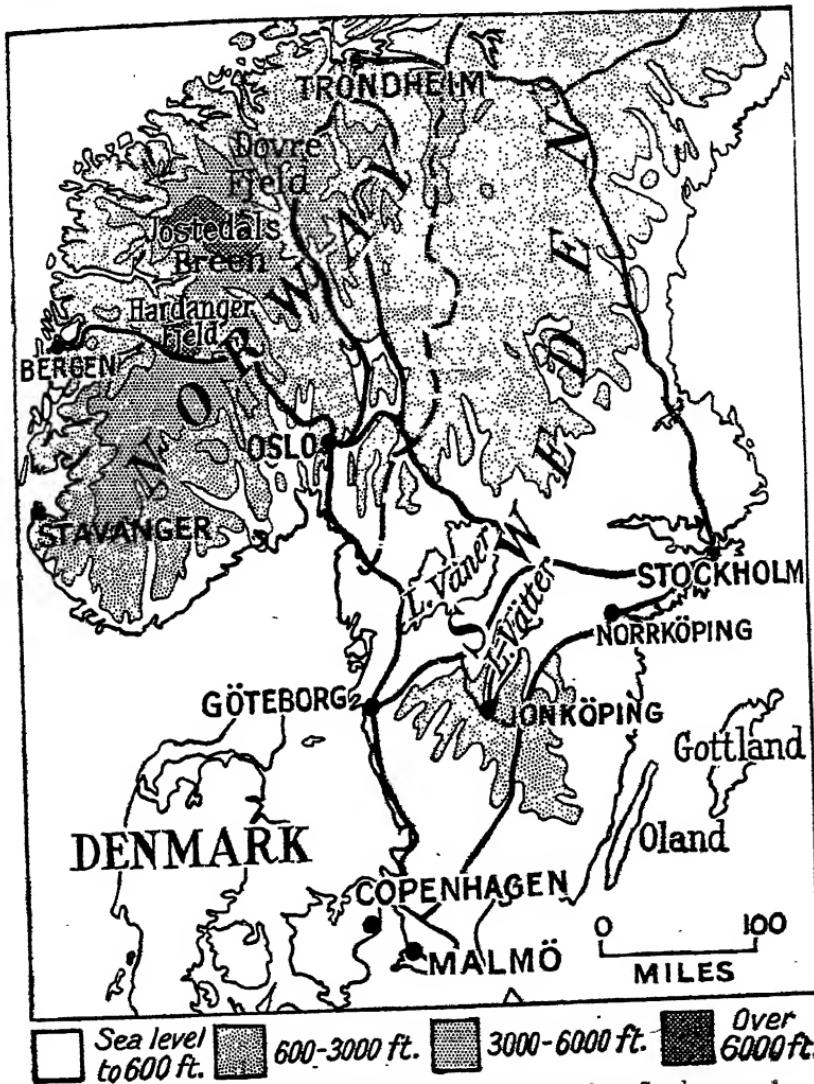


FIG. 141.—Map of Southern Norway and Southern Sweden.

much land as all the cereals. The fodder crops are required for the 3,100,000 cattle, 600,000 sheep, and 1,500,000 pigs. But just as the wealth of Norway comes from the forests and fisheries, so the wealth of Sweden comes from the forests and mines. Forest products represent no less than half the total exports of the country

(wood-pulp, 17 per cent.; timber, 19 per cent.; pit props, 1 per cent.; paper, 9 per cent.; matches, 3 per cent.—1926-29 averages), whilst mine products, including iron ore (7 per cent.), and iron and steel (7 per cent., 1926-9) make up about a quarter. The mining of iron is most important in the famous Gellivara district, north of the Arctic Circle, where much of the ore is exported through the Norwegian port of Narvik. Swedish ore is valued especially for its high quality. The manufacturing industries of Sweden have grown up gradually and are based primarily on the natural resources of the country, and lately on the use of hydro-electric power. Saw-mills are located all along the shores of the Gulf of Bothnia; the production of iron and steel in central Sweden dates from a very early period in Swedish history, before the use of coal in smelting gave an impetus to countries not so richly forested. Industries of later growth include the manufacture of electrical and other machinery, paper and matches, chemicals and textiles (using imported cotton). In the agricultural regions of the south are grain and flour mills, dairies, sugar, and tobacco works and tanneries.

The southern lowland portion of Sweden is often subdivided into three:

The Central Lowlands, with large glacial lakes and glacial soils formerly covered with deciduous forests, now largely agricultural. This region has a network of canals, connecting the lakes, as well as railways.

The Smaland Highlands, lying south of the lake region and lying between 300 and 1,000 feet above sea-level, less fertile and but partly cultivated.

The Plains of Skane in the south of the peninsula; more fertile and milder than the rest of Sweden, and hence very largely devoted to agriculture and dairying. There is an export surplus of dairy produce, mainly from this region, and most of the Swedish wheat grows here.

Stockholm is the capital of Sweden, and has iron industries. The capital is accessible by canal from *Göteborg*, the chief port of Sweden. *Malmö* is the train-ferry station opposite Denmark. The port of *Narvik* in northern Norway is connected by railway with *Gellivara*, one of the rich iron regions. The ore is carried northwards, as the North Atlantic Drift keeps the ports of Norway ice-free, while those of the enclosed, shallow and fresh Baltic freeze. *Norrköping* has textile works, and *Jönköping* is another industrial town. The saw-mill towns as well as Stockholm suffer from being ice-bound for many months of the year.

Sweden is fairly supplied with railways, and has numerous canals. The most important canal system is that which connects the North Sea through lakes Vener and Vetter with the Baltic Sea (the Gota Canal).

The exports of Sweden have already been noted ; amongst the varied imports cereals, coal and coke, textiles, and raw cotton take an important place. Nearly half the foreign trade is with Germany and Great Britain.

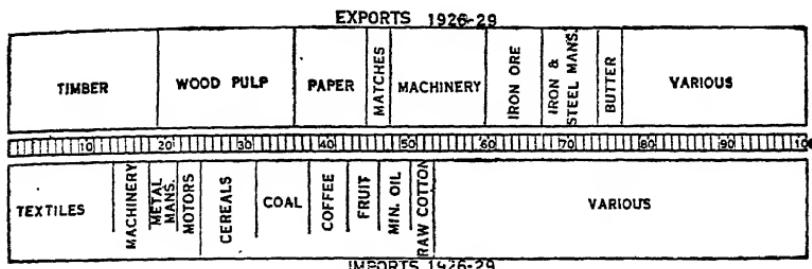


FIG. 142.—The trade of Sweden.

SUOMI OR FINLAND

Finland is an independent republic with an area about one-fifth larger than the whole of the British Isles, and with a population of rather over $3\frac{1}{2}$ million. Practically the whole country lies north of the latitude 60° N., and so Finland has the distinction of being the northernmost independent country in the world. It stretches from the shores of the Gulf of Finland in the south to well within the Arctic Circle, and has a tiny stretch of coastline on the shores of the Arctic Ocean. On the west lies the Gulf of Bothnia, and further north is the boundary with Sweden and Norway. Only on the east is the boundary really a purely artificial one—namely, that with Russia. From 1809 to 1919 Finland was an autonomous Grand Duchy under the Russian Empire ; but her people are very different from the Russians, and the country gained independence after the Russian revolution.

Finland is not nearly as well known in England as it should be, and some very erroneous ideas are prevalent. In the first place, the Finns are very like the other Scandinavian people ; they are tall, well-built people, usually tending to have fair hair and blue eyes. Nine-tenths of the people speak Finnish, hence the desirability of using the Finnish name, Suomi, for the country instead of the Swedish name Finland ; most of the remainder speak Swedish. Finnish is a language very closely allied to that of Estonia and akin to Hungarian. In the north of Finland, mainly in the high country which forms the divide between the Baltic and the Arctic ocean drainages, there are about fifteen hundred Lapps, a scattered race of people who, like the Eskimos, depend for their existence to a very considerable extent on their reindeer. Unfortunately the Finns are too often confused with the Lapps, who, it will be seen, form a very insignificant group of comparatively uncultured people

in the north of the country ; whilst the Finns themselves are physically and intellectually people of great stature.

Physical Features and Structure.—Part of the great mass of Fennoscandia, Finland consists of a complex of ancient crystalline rocks, the main features of which have already been described. Finland was, of course, entirely covered by the great ice sheet which formed over Fennoscandia during the Great Ice Age. The raised surface was planed and smoothed by ice action, with the result that at the present time very few of the numerous rounded hillocks exceed 500 feet above sea-level in height, whilst the innumerable hollows are now occupied by lakes. Finland has been

called the Land of Ten Thousand Lakes, but if one made that figure fifty thousand it would be more correct. Stages in the retreat of the ice sheet are marked by ridges, whilst sands and gravels were deposited in the hollows after the ice melted, and now form the bulk of the fertile land in the country. These ridges are found especially along the southern and eastern borders of the country. The central portion of the country forms a low plateau, so that one may divide Finland into the following natural regions :

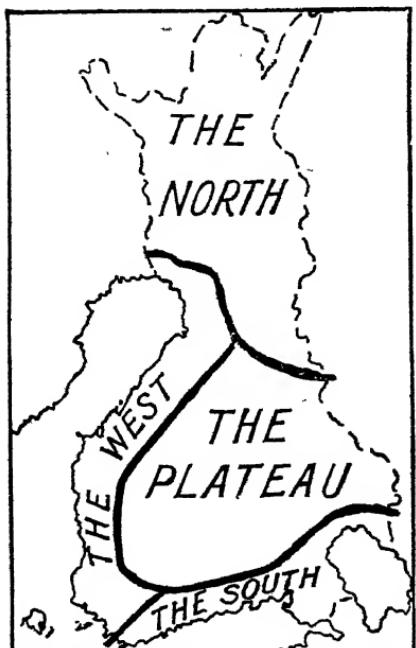


FIG. 143.—Natural regions of Finland.

waters of the Gulf of Finland, passes insensibly into an archipelago of innumerable islands.

(c) The western coastal belt, where lakes are infrequent and where there are very wide stretches of comparatively unfertile land, some of which represents deposits in a once larger Baltic Sea or Lake.

(d) The high country of the north forming the Baltic-Arctic divide and the land sloping towards the Arctic Ocean.

This division is of some considerable importance, because of the extraordinary network of lakes and watercourses which enable continuous water traffic to pass over the greater part of the country, and,

still more important, to permit the removal of timber from forests which would otherwise be rather seriously inaccessible. Further, the waters of the central plateau find their way to the coastal strip over the edge of the low plateau in a series of rapids and sometimes of waterfalls—a very important source of power in a country which has no coal and is even seriously devoid of minerals of all kinds. The principal point where water-power has been developed is Imatra.

Climate and Vegetation.—The climate of Finland is intermediate in character between the oceanic climate of the coast of Norway and the essentially continental climate of the mainland of Russia. Owing to its northern latitude, the whole of the country is frost-bound in winter. In January the isotherm of 24° just touches the south-western islands, so that here the port of Hangö is the one port which remains open throughout the year, whilst the principal port and capital, Helsingfors, is closed by ice. It gets steadily colder as one goes northwards, until one passes the Arctic divide and comes within the influence of the comparatively warm waters of the Arctic Ocean, which are here never frozen. North of the Arctic Circle, of course, there is at least one day during the year on which the sun never rises, and correspondingly at least one day in the summer on which the sun never sets. Indeed, when one considers summer conditions, there are two important factors to notice. One is the short summer, the hottest month having a temperature of over 60°, characterizing the southern part of the country, and the other is the increasing length of the summer days as one goes northwards.

From the point of view of natural vegetation, it is possible in the extreme south of the country for the oak to grow, although there are no extensive oak woods. Southern Finland may, indeed, be regarded as lying on the borderline between the coniferous forest belt of northern Europe and the deciduous forest belt of central Europe. But with the exception of a Lapland-Arctic belt along the high ground of the Baltic-Arctic divide and the shores of the Arctic Ocean, the whole country may be said to be covered with coniferous forest. The forest, indeed, covers three-quarters of the land surface and forms the principal source of wealth of the country. Almost everywhere there are three principal trees in the Finnish forests: the Scots fir, the Norway spruce, and the silver birch. The presence of the latter prevents the country from having a gloomy appearance, which one often associates with coniferous foliage. In the Finnish forests cleared areas are rare, because it is the custom of the forest workers merely to select those trees which are ready for cutting, and to leave the smaller ones; so that in any given area there are to be found trees and seedlings of all ages.

In the warmer south it takes fifty or sixty years for a tree to reach a sufficient size to be cut; but in the colder north much longer than this is necessary, up to as long as 200 years. So that in technical language one may say that the period of forest rotation varies from 50 to over 200 years. As usual, the cutting of the timber

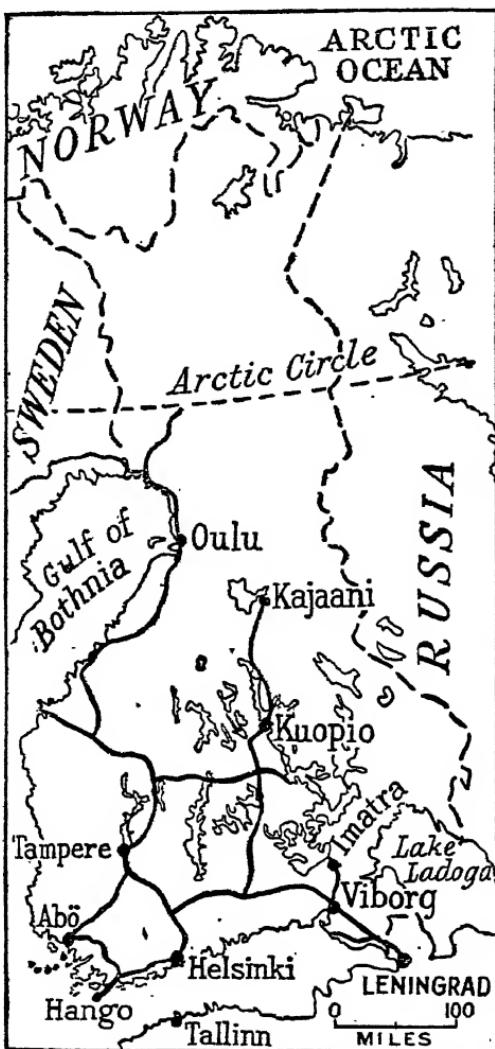


FIG. 144.—Towns and Communications of Finland.

goes on through the winter months, and the logs are piled on the banks of some watercourse. In May, as soon as the ice-bound lakes and rivers commence to melt, the logs have to be put into the water and either float down or are rafted and towed down by steamers. Lumber timber is important, and still more significant is the manu-

facture of wood-pulp, quantities of which are exported to Britain. The pine and the spruce are used for this purpose; but the birch is a better wood for burning, and is also used for such purposes as making into reels or bobbins, or again into three-ply and five-ply boards, the manufacture of which is another important industry. The making of matches is also carried on, the wood specially favoured for this purpose being the aspen.

Agriculture.—Farmland occupies about 6 per cent. of the surface of Finland, and is found in all those depressions which are filled by glacial soil, whereas the forest is often found growing almost on the bare, ancient rock. Finland is almost beyond the normal limits of wheat cultivation, but oats will ripen in the cool northern latitudes, and they occupy more ground than any other cereal crop. Rye is also grown to a considerable extent, whilst barley can utilize the long summer days and is found ripening well within the Arctic Circle. But through much of Finland, especially the north, the only crop which will mature is the potato. Though the rainfall is not heavy, the evaporation in northern latitudes is low, and so grass can be seen through most of the year, and hay can be cultivated for the winter feeding of cattle. Hence cattle-rearing and the production of butter are industries of outstanding importance in Finland.

Manufactures.—Although the various wood-working industries are outstanding amongst the manufactures, Finland has important engineering works, and also manufactures textiles and clothing for her own use.

Population and Communications.—Finland has not only a remarkable network of waterways, but has an efficient railway system on the broad Russian gauge. This centres naturally on the principal port and the capital of *Helsingfors* (its Swedish name) or Helsinki (the Finnish name). This is a town of some 220,000 inhabitants. *Viborg*, or *Viipuri*, is the principal port of the south-east of the country, as *Abō*, or *Turku*, is for the south-west. *Tampere* is the principal inland centre, with a population of over 15,000, whilst *Kuopio* is a provincial town in the heart of Finland's lake district.

Foreign Trade.—The foreign trade of Finland is most easily studied by the diagram. Roughly 40 per cent. of the exports go to Great Britain, apart from large quantities of Finnish butter which reach this country *via* Denmark. Great Britain also leads with about 25 per cent. in supplying imports, the second place being taken by Germany and the United States. In a country such as Finland, where inland waterways play so important a part in the life of the people, it is natural that the Finns should be traders and navigators. Consequently at the present time Finland has a large merchant navy of 5,000 vessels, including not a few of the

fine old four-masted sailing ships. Some idea of the progressive nature of the Finnish people may be gained from the importance of

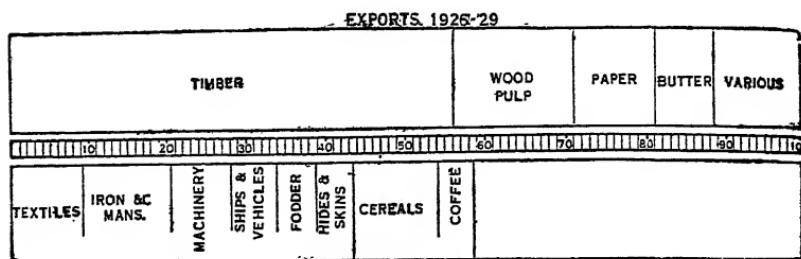


FIG. 145.—The trade of Finland.

air communication by Finnish-managed aeroplane lines, and from the fine architecture of the principal Finnish towns.

RUSSIA

Position and Size.—Russia or, to use the modern title, the Union of Socialist Soviet Republics (U.S.S.R.), forms the largest continuous political unit in the world. The growth of the old Russian Empire was quite different from that of the British Empire. Russia's growth consisted of a gradual expansion over neighbouring lands and people, so that although the bulk of the territory is a vast plain, the Union includes within its boundaries the tundra dwellers of the far north, the hunters and lumbermen of the great forests, the nomads and later the cultivators of the steppes, and the desert camelmen of Turkistan. In the forceful words of Miss R. M. Fleming,¹ “The Ancient Kingdoms of Georgia and Armenia, with their long tradition of Christian culture, the Moslem Central Asiatic Republics, with their age-long irrigation, civilization, and the glamour of the cities of Samarqand and Khiva and Bukhara, have been gathered into the same political framework as the lowly tribes of far Kamchatka. The larger part of Russian territory lies in Asia, and from remote antiquity waves of population from Asia have washed into and intermingled with waves washing out from Europe, so that Kipling's ‘East is East and West is West and never the twain shall meet’ emphatically does not apply to Russia.”

In the still obvious intermingling of Europe and Asia, Russia stands apart from the rest of Europe. The plains of European Russia are separated from those of Asiatic Russia merely by the low rise of the Urals ; the Russian people are of surprisingly varied physical type—some are purely Mongol (there are still enclaves of Tartars in the Crimea and on the lower Volga), others Slav, others

¹ Lecture delivered to the Geographical Association, January 1931. See also “Studies in Regional Consciousness and Environment,” 1930.

even essentially Nordic. But the Slav colonization made the Russian nation out of a multitude of materials, and therein is a parallel in Russia with the United States of America. But there is at the same time a vast difference. The area of Russia is $8\frac{1}{2}$ million square miles, and the population 166 million (compare United States 3 million square miles, population 123 million), but whereas America



FIG. 146.—European Russia: political and general.

has largely conquered distance, Russia has set herself the task. Until recently one section of Russia was but dimly conscious of the existence of another, the apparent railway network even of the most settled parts disappears when compared with the real network of Western Europe. The capital of one of the republics composing the Union is still 1,800 miles from a railway.

In this book we are concerned with European Russia—with an

area of nearly 1 million square miles and thus equal to one-third of the continent. Even this fragment of the whole Union stretches 2,000 miles from north to south and from far within the Arctic Circle to latitude 40° N.

Physical Features and Structure.—The essential structural features of Russia have already been considered. Briefly recapitulated they are as follows :

(a) The presence of the underlying stable block of ancient rocks, the Russian platform. Although this block has been resistant to folding, it has suffered slow movements of elevation and depression, and so is largely covered with sediments which are, however,

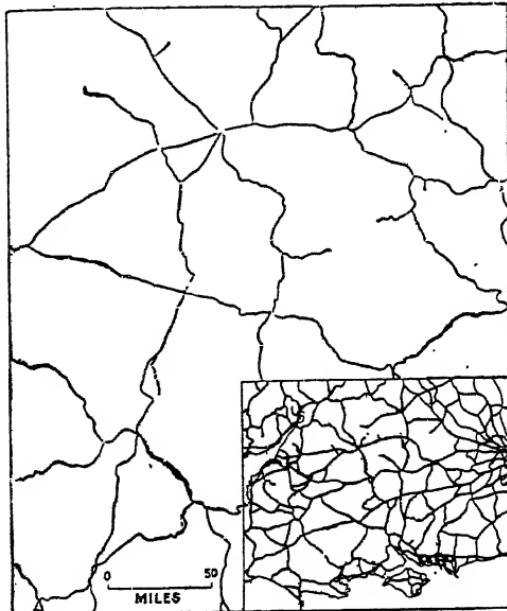


FIG. 146A.—Comparative railway networks of Russia and England (inset) on the same scale.

practically horizontal. The movements of elevation and depression have been fortunate for Russia, because amongst the other deposits laid down, are, in two important areas, coal seams. These two areas are the Tula Basin, south of Moscow, and the Donetz Basin.

(b) The Fennoscandian glaciers swept over much of Russia from the north-west, and so the country is largely covered with a mantle of glacial deposits. Sandy ridges alternate with marshy hollows in the forest country of the north ; wind-borne dust or loess predominates in the south. It is largely as a result of the glacial deposits that Russia, though almost entirely a plain, is far from having a monotonous flat surface.

(c) Russia includes in the south the Alpine folds of the Caucasus continued in the Crimea, as well as the low Urals already mentioned.

Minerals.—The minerals of European Russia may be considered in the following groups :

- (1) The Coalfields.
- (2) The Oilfields.
- (3) The Iron Ores.
- (4) The Minerals of the Urals.
- (5) The Minerals of the Caucasus and Transcaucasia.
- (6) The Minerals of Ukraine.
- (7) Salt.

The Coalfields.—The chief coalfields of European Russia, with their estimated reserves and average productions, are the following :

Field	Millions of tons		
	Reserves	Output	
		1934	1937 est.
Donetz	71,088	60	80
Tula or Moscow	5,930	5	10
Ural	5,038	5.5	13
Pechora	60,000	—	—
Transcaucasus.	189	0.2	1.4

For purposes of comparison the following table shows the position for the coalfields of Asiatic Russia.

Kuznetzk	400,000	11.6	20
Minusinsk	14,000	*	*
Kansk	40,000	*	*
Irkutsk.	75,000	3.5	4.5
Tunguz.	400,000	*	*
Bareinsk (Far East)	60,000	*	*
Yakutia	60,000	*	*
Vladivostok	3,775	3.0	6.5
Ferghana	5,263	1.0	3
Karaganda	20,000	1.8	7

* Total minor areas 1934 2.0; 1937 estimate 4.5.

In 1913 the total production of coal in Russia was 29 million tons, 87 per cent. of which came from the Donetz Basin. During the Revolution coal production dropped to a very low level, but by 1928, when the First Five Year Plan was put into operation, it was a little above the 1913 level. In 1934 the production had reached

93½ million tons, and the production for 1937 scheduled under the Second Five Year Plan is 152½ million tons. Taking the position in 1934, there are two striking features—the large total increase and the opening-up of the new fields especially in Asiatic Russia. The output of the Donetz Field has doubled, but provides only 64 per cent. of the total. The brown coal field of Moscow is being seriously exploited, and yielded in 1934 5 per cent. of Russia's total. But the fields of Asiatic Russia now yield a quarter of the country's total, compared with 8 per cent. in 1913. This is part of the general plan to develop large centres of industry in all the major divisions of the country. Several of the fields have only recently been discovered or mapped—notably the Pechora field first noted in 1923. Russia is now believed to have 15 per cent. of the world's coal.

A new development has been the utilization of peat in the northern half of the country.

The Oilfields.—Russia is second only to the United States in the world production of oil—the output in 1913 of 9,200,000 tons being increased to 25,500,000 in 1934, whilst the scheduled total at the end of the Second Five Year Plan in 1937 is 47,000,000 tons. Oilfields occur :

(a) On both flanks of the Caucasus—on the south by far the most important area is around Baku, producing two-thirds of Russia's oil. The oil is sent by pipe-line to the Black Sea and the pre-War working was by British interests. Oil also occurs near Tiflis. On the north the most important area is around Grozny, other areas including Maikop.

(b) On the flanks of the Urals from the Pechora region in the Arctic north to Emba on the shores of the Caspian Sea. A chain of fields has been discovered, but they are only now being opened up.

Russia also has oil in the Asiatic territories bordering Persia as well as in Sakhalin in the Far East.

The Iron Ores.—The best-known and most important iron ore field in Russia was that of Krivoi Rog in the Ukraine—now known to be part of a huge area lying west of the Donetz coalfield. Near the southern end of the Urals is the famous Magnet Mountain, near which has grown up the great iron and steel town of Magnitogorsk, but this is only one of the important iron deposits associated with the Urals. An important one recently discovered is near Orsk. In the far north rich iron ores occur in the Kola Peninsula, whilst a huge new deposit has been discovered at Kursk in the steppes of Asiatic Russia.

The Non-Ferrous Minerals of the Urals.—Amongst the important minerals of the Urals, the ores of copper take a leading place.

Nickel, gold, platinum are also important, whilst large deposits of potassium salts have been discovered in the north.

The Non-Ferrous Minerals of the Caucasus.—The richness of Transcaucasia in minerals has long been known, but serious exploitation is recent. Copper is important, also manganese; lead

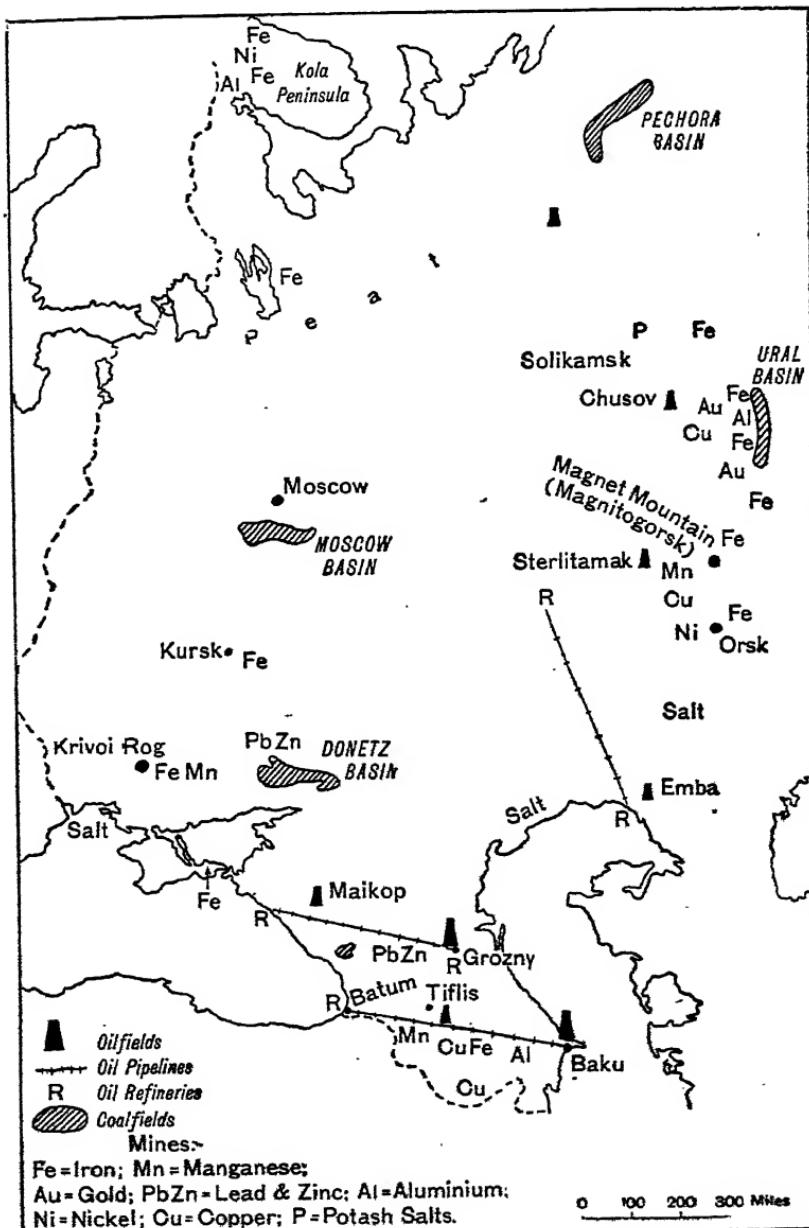


FIG. 146B.—The coalfields, oilfields, and minerals of European Russia.

and zinc are at present mined *north* of the Caucasus and the extraction of aluminium is experimental.

The Minerals of Ukraine and South Russia.—Apart from the iron ore, manganese is important, whilst lead and zinc occur near the Donetz coalfield.

With the modern unification of Russia, it is useless to consider the European area alone: the reserves of Russian Central Asia and Siberia must be remembered. Some of these are considered in Part IV of this work.

Salt.—Salt is obtained from the dry south-eastern tracts north of the Caspian Sea, as well as from the Black Sea and from the northern and southern ends of the Urals.

Climate.—There are certain outstanding features of the climate of Russia which deserve special emphasis. In winter (as shown in the isotherm map for January, Fig. 14) the whole vast territory, with the exception of a small strip in the south, suffers from an average temperature below freezing. As one goes northwards so the period during which the country is ice-bound steadily increases. During the long winter outdoor occupations such as agriculture become impossible, and a prolonged annual pause in the life of the country is the result. The Moscow district, for example, has a vegetative period when crops are growing of 180 days—less than half the year; in the north, in the Forest Belt, this is reduced to less than 100 days.

In the summer, on the other hand, high temperatures are the rule. Temperatures of over 80° are recorded right from the Arctic Ocean to the Black Sea.

When one considers rainfall, the north has a small but adequate precipitation owing to the high humidity; the centre has, broadly speaking, enough; whilst in the south one passes through the steppe zone, with its spring rains, into the belt of desert round the Caspian. But much of the steppe zone suffers from irregularity of rainfall, so that years of bounteous harvest when complete harvesting presents great difficulty alternate with years of terrible famine when thousands die of stark starvation (as in 1911 and 1921).

Rivers.—The peculiar importance of Russian rivers is really connected with three groups of geographical factors—position, topography, climate. In the first place, because of the enormous size of the country and the consequent inadequacy of man-made highways of road and rail, the rivers play a large part in providing means of communication. But it is unfortunate that more than half the country lies in the basin of the Volga, which drains to the south-east (in the wrong direction) to the desert lands surrounding the sparingly useful Caspian Sea. The important Northern Dwina flows northwards to the Arctic Ocean, the Western Dwina passes

through alien territory before reaching the Baltic. But to the south the Dniester, Dnieper, and Don drain to the Black Sea. In the second place, the low relief is responsible for the enormous stretches of river uninterrupted by a rapid or waterfall. But at the same time it is the low relief—even the Valdai Hills from which the great Volga takes its rise are scarcely a thousand feet high—which cause the tortuous windings and the presence of sandbanks and shallows. It is the climate, however, which really reduces the usefulness of the rivers. Shallowing in late summer is succeeded by winter's grip, and the map shows the period during which the rivers are ice-bound. After the thaw in the spring the rivers are

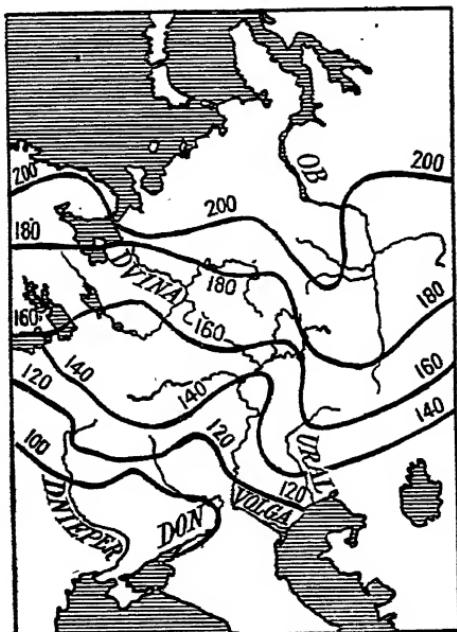


FIG. 147.—The rivers of Russia, showing the number of days per year on which they are ice-bound.

again for long impeded by floating ice, and navigation is effectively prevented. The usefulness of Russia's rivers could be and is being increased by canal links as noted below, but it should be noted at the same time that the river system has impeded the development of both rail and road owing to the numerous costly bridges required.

Mention must be made of the famous river fisheries of Russia—in particular the sturgeon fisheries. Sturgeon roe furnishes the celebrated caviare.

Soil.—It is to Russian scientists that the credit is due for realizing that the type of soil produced by weathering depends much more on climate than on the character of the underlying rocks.

It is possible to distinguish in Russia great soil belts running roughly from south-west to north-east.

(a) The tundra soils of the far north are humid and peaty owing to the permanently frozen subsoil (preventing seepage of moisture downwards) and low evaporation.

(b) The podsols or podsolized soils of the forest belt are ash-coloured soils. They are seen on heathland and some coniferous forest land in Britain ; the colour has been removed from the upper

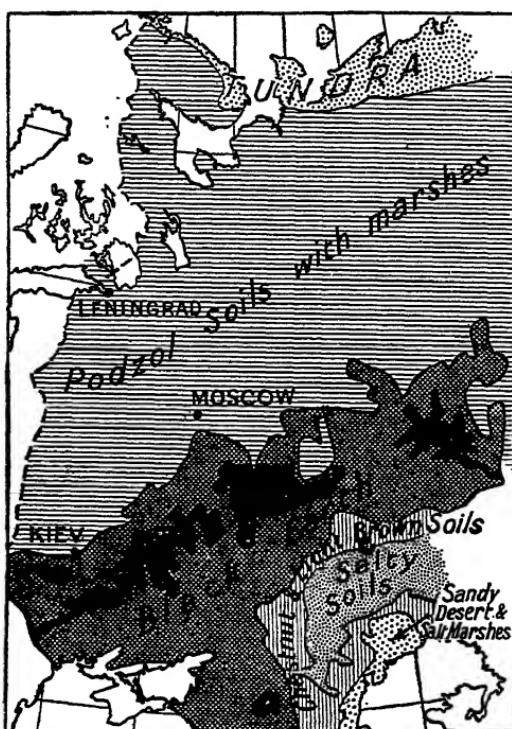


FIG. 148.—The soil belts of Russia.

The richest parts of the black earth belt are shown in black.
"Podsol" is now the more usual spelling in English.

layers by the process known as leaching, whilst the lower layers are darker because they contain some humus.

(c) The black earth or chernozem soils are the fertile soils of the steppelands produced under conditions of high evaporation in summer and long freezing in winter.

(d) The chestnut brown soils are found in the drier parts of the steppelands.

(e) The saline soils occur round the north of the Caspian Sea.

The Vegetation Belts and Natural Regions of Russia.—Russia was, until recently, essentially an agricultural country : the character of the agriculture depends upon climate and soil, with the

result that the great natural regions of Russia coincide very closely with the regions which may be distinguished on a basis of natural vegetation. Even on a population map the industrial districts of Moscow and Tula are seen to be mere local developments in the midst of a belt of comparatively constant character.

The Tundra Region.—This is the treeless region of the north, where moss, lichen, summer herbs or grass, and dwarf shrubs form the principal vegetation. Agriculture is impossible, the few poor nomadic inhabitants, such as the Lapps and Samoyèdes, rely mainly on their reindeer herds and a little fishing in summer. The transport for most of the year is by reindeer or dog-drawn sledges. The most important tracts are usually the more sheltered river valleys, along which tongues of forest penetrate from the south. Owing to the warm waters from the North Atlantic Ocean, the Arctic shores remain free from ice, and *Murmansk*, an ice-free port, has been connected with Leningrad by rail. Attempts are being made to investigate scientifically the possibilities of pastoral industries, whilst a remarkable industrial development has taken place along the railway to Murmansk—associated with mining for iron, nickel, apatite (for manufacture of phosphatic manures) and electric power works.

The Coniferous Forest Belt.—The podsol soils of this belt vary in character from clays to coarse sands, with the result that large areas of marsh may exist on the clayey areas. These marshy tracts have acted as barriers to communication, but at the same time have formed protective barriers behind which such peoples as the Finns have sheltered from invaders. The two chief trees of the belt are the spruce and the Scots pine; the former prefers wet, heavy soils and so predominates on the clayey soils; the latter prefers the drier sandy tracts. The presence of the deciduous birch lends further variety to the forest. Little agriculture is possible in the north of the forest belt, but towards the south extensive forest clearings are cultivated or afford pasture for dairy herds. Rye bread and cabbage soup form the two great staples of the peasant diet. Flax is grown round the great glacial lakes of Ladoga and Onega. In the north hunting, fishing, and lumbering are the staple occupations—agriculture becomes more important southwards; various species of deciduous trees become more numerous, and the coniferous forest belt grades insensibly into the next. *Leningrad* (1,600,000) lies roughly where the southern limits of the belt reach the coast.

Notice the position of Leningrad on a deep inlet of the sea, giving access to the interior of Russia, but at the same time easily accessible by water from the industrial countries of north-west Europe. Leningrad is guarded by the island fortress of Kronstadt, but the new republics of Finland and Estonia now control the entrance to the gulf. Leningrad is blocked by ice for some weeks: Archangel, on the White Sea, for five or six months.

The Mixed Forest Belt.—On the accompanying map are shown the approximate northern limits of the oak and the normal southern limits of the Scots pine. Roughly between these two lies the mixed forest belt. Here the cultivation of deciduous fruit trees—apples, pears, and cherries—is possible; agriculture is more important and



FIG. 149.—Forests belts of Russia.
(After R. M. Fleming.)

more varied. Indeed, the belt is in the main an agricultural one. The chief crops are flax, rye, barley, oats, and potatoes. Flax and oil seeds together with Russian hemp are exported, but not enough grain is grown to feed the people. The surface is far from monotonous: marshes are still numerous in the boggy hollows, but the better drained valleys favour agriculture and the sandy ridges

are largely occupied by Scots pine. Here again the long winter enforces inactivity ; the peasant needs some outlet for his energies during this long, dreary period, with the result that peasant or *koustar* industries are widely developed. In particular the making of wooden utensils of all kinds, woollen clothing, felt boots and caps, homespun linen, furniture, pottery, and toys may be noted. These almost universal peasant industries have had a widespread influence. In the first place, the need for exchange and the difficulty of travel and transport over wide distances led to special efforts being made to meet in certain centres at certain times of the year, and so to the institution of great annual fairs, as at Gorky (Nijni-Novgorod). In the second place, the village industry developed naturally in certain areas into a factory industry. This happened in the Moscow industrial region, which was, in pre-War Russia, almost the only industrial area and where now five towns at least—Moscow (2,400,000), Tula, Yaroslavl, Ivanova-Voznesensk, and Kalinin (Tver)—boast a population of over 100,000.

But the scanty returns of agriculture and the enforced inactivity of winter in the forest belts of Russia have had other effects. The first is the wandering in search of seasonal work by large bodies of peasants which has developed into almost permanent nomadism. The nobility of the old Czarist régime found it necessary to enforce serfdom to prevent seasonal loss of labourers ; the present government finds itself in the same position. The encouragement of peasant industries tends to keep the people settled at home ; the inadequate supply of fuel (wood in particular) south of Moscow has been supplemented by the erection of electric power stations, using peat or local coal. Most of the trade from this region passes through Leningrad, since the port of Riga is no longer in Russia.

The Steppe or Grassland Belt.—This belt is not sharply marked off from the last. Oak forests penetrate southwards along the moister valleys, whilst not a little of the most fertile of the "Black Earth region" owes the fertility of its soil to former oak forests. On the northern fringe of the former open oak forests stood *Kiev*. *Kharkov* is another important centre. The rich black soil is ideal for wheat, and this region is one of the great wheatlands of the world. Other crops, grown more for home use, include rye and barley, and, in the wetter south-west, maize and sugar-beet. The south-west of Russia or the steppe region lies in Ukraine. For long under Polish-Lithuanian rule, Ukraine only became completely under Russia at the end of the eighteenth century. Again after the Great War it became a battleground of opposing forces—German and Austrian, French and Polish, as well as Russian. With a large and fertile population, pressure on the land is considerable, so that the most fertile part of Russia is at present not exactly the most prosperous. But the possibilities are great in this vast wheatland.

The whitewashed, orchard-surrounded Ukrainian cottages contrast with the log huts of central Russia and emphasize the difference.

In the steppe belt of Russia lies the great Don coal basin. Nearby are rich deposits of iron ore, and large quantities of pig-iron are produced. Manganese also occurs. The outlet of the whole area is naturally by the Black Sea ports, especially Odessa.

The Desert Belt.—This belt develops with increasing aridity and increasing salinity of the soil south-eastwards from the steppes around the north of the Caspian Sea.

The Southern Crimea.—In southern Russia the climate becomes sufficiently genial for the growth of the vine. In the south of the Crimea, sheltered from cold northerly blasts by the east-west mountain ridge, is a small tract which may even be called "Mediterranean." But there is a tendency to exaggerate grossly its area and importance.

The Caucasian Regions.—Stretching between the Black Sea and the Caspian Sea is the great rampart of the Caucasus Mountains, with its snow-capped peaks and forested slopes. The contrast with the steppes to the north is emphasized by a change in the characters of the people—the typical independence of mountain peoples which is recognized in the present constitution of Russia by the institution of a number of autonomous regions. Across the rampart lie Georgia, Armenia, and Azerbaijan, whose peoples for long resisted the Russian yoke and which to-day are independent socialist republics within the federation. The capital and centre of Georgia is Tiflis, of Armenia Eriwan, and of Azerbaijan the oil town of Baku.

The Urals.—The Ural Mountains are also famous for their richness in minerals. Platinum, gold, copper, and large quantities of iron ore are obtained, and have given rise to much industrial activity in recent years, including the establishment of Magnitogorsk.

Communications.—Of the quarter of a million miles of inland waterway, 54,500 miles are navigable by steamers and another 110,000 miles by rafts. Fig. 149A shows the navigable waterways with the existing and projected canals. By way of contrast the total length of railways, including Asiatic Russia, is about 48,000 (compare Great Britain alone, 20,000 miles). It is planned to increase this to 56,000 miles by 1937. The Russian railways are for the most part of broader gauge than those of the rest of Europe. So trains cannot run direct from Russia to Western Europe. The breaks of gauge on the two main lines are at Riga and the Polish frontier. Civil aviation has made rapid strides in the U.S.S.R. Many

thousands of miles of regular routes are operated; in winter the planes are furnished with skis, which enable them to alight on and take off from snow surfaces.

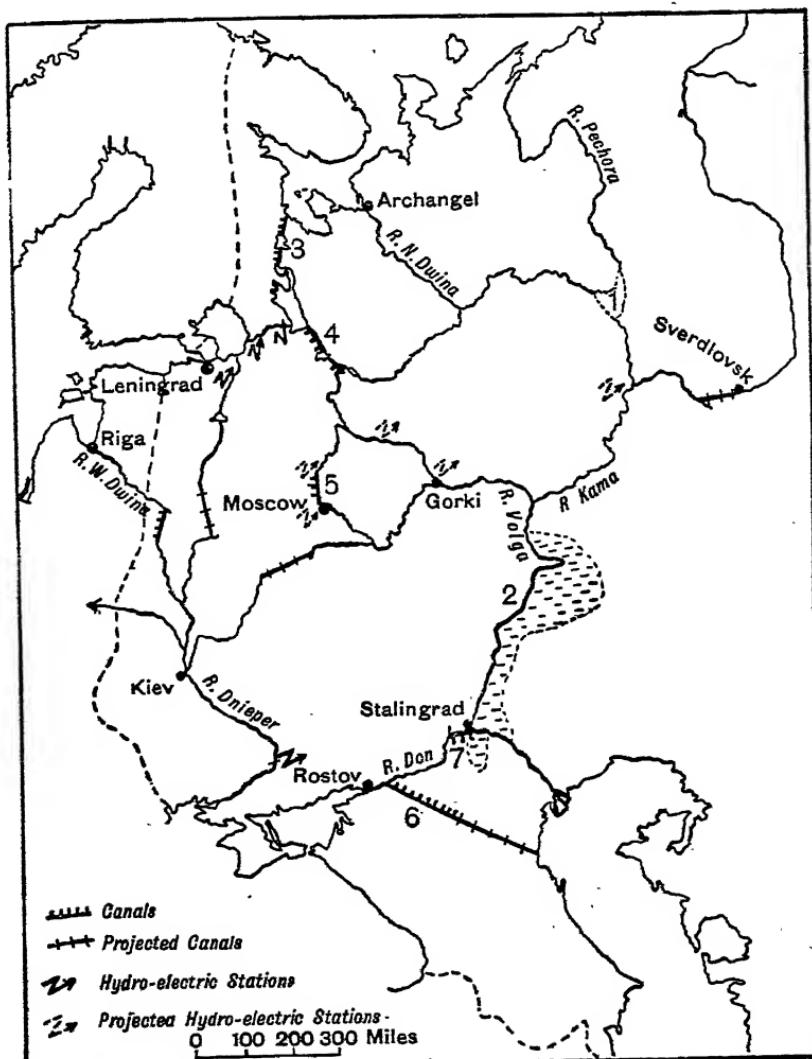


FIG. 149A.—Waterways of European Russia.

2—The territories near the Volga which it is proposed to drain. Canals:—3. The very important "Stalin" or White Sea Canal linking the Baltic with the White Sea and giving Russia a water outlet open for most of the year, which is not "controlled" by any other power. 4. The Baltic-Volga Canal. 5. The Volga-Moscow Canal. 6. The "Maryansk" Canal, under construction to link the Black Sea and the Caspian Sea. 7. The Volga-Don Canal. 1. This is a proposed reservoir, the object of which is to maintain a steady flow in the rivers.

Internal Trade and Industries.—Before the Great War the Russian Empire, next in order of size to the British Empire, com-

prised one-seventh of all the land of the globe. After the Bolshevik Revolution of 1917 the new independent republics of Finland,

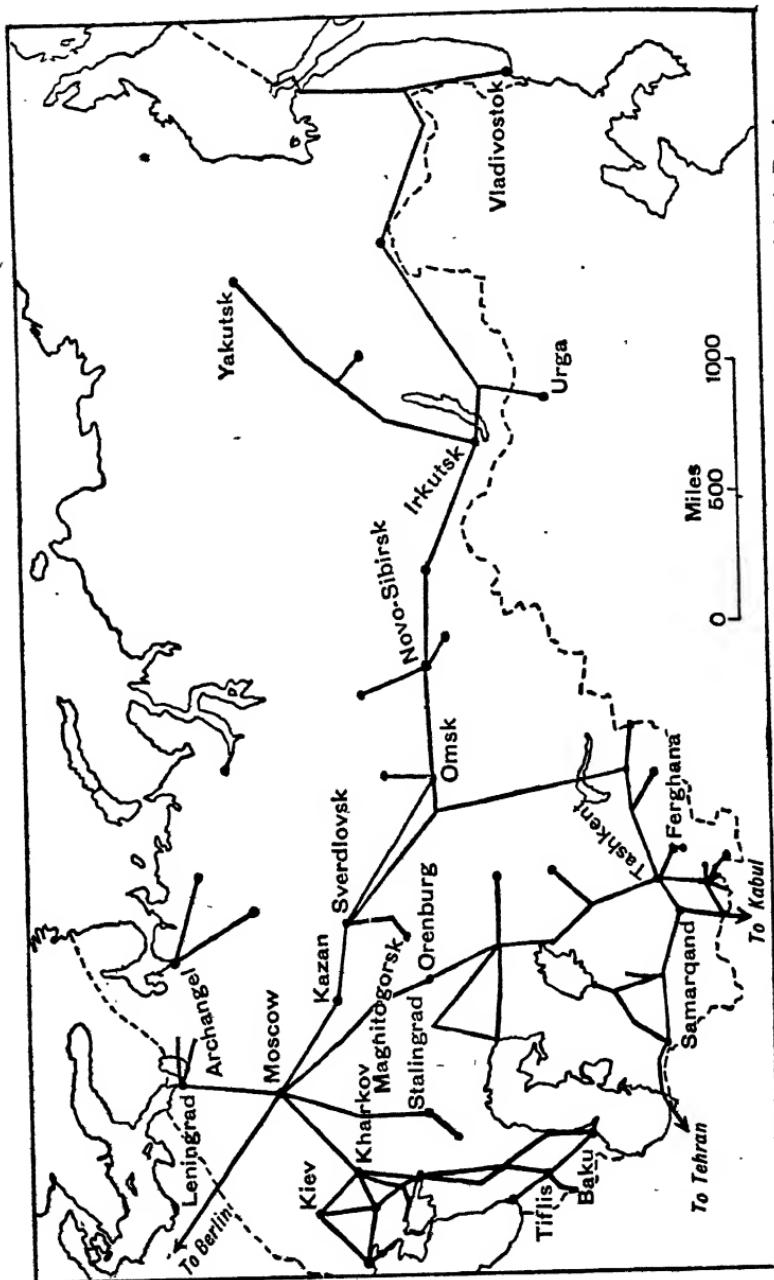


FIG. 149B.—The regular airways of U.S.S.R. in 1934 showing connections of European with Asiatic Russia.

Estonia, Latvia, Lithuania, and most of Poland were carved out of the fringes of Russia. But the remainder now constitutes the Union

of Socialist Soviet Republics, of which the largest, or Russia proper, is the R.S.F.S.R. (Russian Socialist Federal Soviet Republic).

In a soviet republic all private property in land is abolished, all land being the common property of the people. All forests, mines, waters, and livestock are national property; the State owns all factories, railways, and buildings.

With such absolute control, the State has set out to convert Russia from being in the main a primary producer to a self-sufficing secondary producer, and the first "Five Year Plan" (1928-32) aimed at industrializing the country in five years, so that it would be independent of foreign supplies of manufactures of all kinds. One great result of these plans must of necessity be a new form of national consciousness: the realization by one section of the 166,000,000 people of the existence of the other sections. Concurrently must come the development of internal trade and communications. But money for development must come by sale abroad of primary products. Hence the recent great efforts to resuscitate foreign trade. Industrial production now exceeds agricultural in total value.

But Russia is a huge country. Before the revolution of October 1917 its needs in manufactured goods were served largely by two centres—St. Petersburg (Leningrad) and Moscow. Neither was well situated relative to raw materials—the former owed its importance to its being the port connecting Russia with Western Europe, the latter had to draw its coal from the Donetz Basin, its iron from Ukraine, and its cotton from Central Asia 2,000 miles away. Two other industrial centres were Ivanov and Nijni-Novgorod (now Gorky). It has been the object of the new régime, through the First and Second Five Year Plans (1928-32 and 1933-7), to secure a more even distribution of industry and one based more on the availability of power and raw materials and the presence of markets. By the end of 1932 the relative importance of the industrial regions, measured by the capital invested in them, was as follows:

1. Central Region (including Leningrad and the Moscow areas)	41
2. Ukraine	22
3. Urals and Kuznetzk Coalfield of Siberia	11
4. Transcaucasia	6
5. Volga Region	5
6. Central Asia	2
7. Other Regions	13

We may now consider briefly each of the chief industrial regions.

Central Region—Leningrad.—Leningrad has the advantages of its position, but it is far removed from a coalfield; its site was formerly a swamp on the border of the almost uninhabited northern

forests, far from sources of food and raw materials. The region is now served by the first of the Soviet hydro-electric power stations, as well as by others since constructed, and from stations using peat fuel. Leningrad is concerned with metal and metal-using industries (including now electrical machinery) and shipbuilding (especially of timber ships and icebreakers).

Central Region—Moscow.—The factories of the Moscow region formerly used coal from the Donetz Basin. Recently much more use has been made of the inferior brown coal of the Moscow Basin, either directly or as electric power. The whole area, together with Gorky and Ivanov, is linked by an electric grid which is eventually to cover the whole of Russia. Moscow was pre-eminently the textile city and still produces half the cotton fabrics made in the country, but it has now become a great machine producing centre and with a large heavy chemical industry. Its clothing industry is noteworthy.

Central Region—Ivanov.—This region is a close rival of Moscow in textiles, but both will decrease in relative importance as Central Asia and Siberia grow.

Central Region—Gorky.—Gorky is proud of its automobile works and other engineering works.

Ukraine.—The industry of Ukraine reflects two things—the abundance of iron ore and coal and the output and needs of a rich agricultural region. On the one hand comes the production of two-thirds of Russia's pig-iron. Formerly the coalfield did the smelting, receiving the iron ore from Krivoi Rog 300 miles away. Now there are works also near the iron mines. Russia's annual production of pig-iron exceeded 10,000,000 tons in 1934 (compare Britain 7,000,000 in 1925, before the great depression). It is claimed that the hydro-electric power station on the Dnieper is the most powerful in the world. With this reserve of power it is not surprising to find an extensive industrialization—with factories for tractors and agricultural implements at Kharkov and many southern points including Odessa and Rostov. The utilization of agricultural produce is seen in the numerous beet-sugar factories, flour mills, and canning factories.

Urals and Kuznetzk Coalfield.—Here the major difficulty lies in the occurrence of iron ore and metals in the Urals 1,200 miles from the coal of Kuznetzk. So industry has been developed by the Ural-Kuznetzk Combine operating at both ends. In the Urals the huge centre of Magnitogorsk has arisen, followed by Orsk further south and by the rebuilding of many works further north.

Transcaucasia.—The non-Russian countries of Armenia, Georgia, and Azerbaijan are cut off from Russia proper by the great rampart of the Caucasus Mountains. Across the mountains there is one motor road—the Georgian Military Highway—but no railway. The railways run round the western and eastern ends only. So

Transcaucasia is still isolated, but instead of being neglected is being encouraged to develop its own industries. Some coal is available, abundant oil, and abundant water power. Minerals are



FIG. 149c.—The Industrial Regions of Russia.

at hand and timber from the forests; a local market requires textiles and clothing. Hence the varied industrial development around Tiflis, Erivan, and other centres.

Volga Region.—Here lie the new centre of Stalingrad and the

older one of Saratov in the heart of the agricultural steppe lands and so concerned with supplying the needs of that region.

Minor Industrial Centres.—Amongst these may be noted particularly the Kola Peninsula in the far north and the numerous wood-working centres scattered over the north.

Production and Foreign Trade.—Russia has suffered very greatly from war, famine, and revolution. From 1917 to 1922 enormous numbers of people died from disease and starvation. Fig. 150

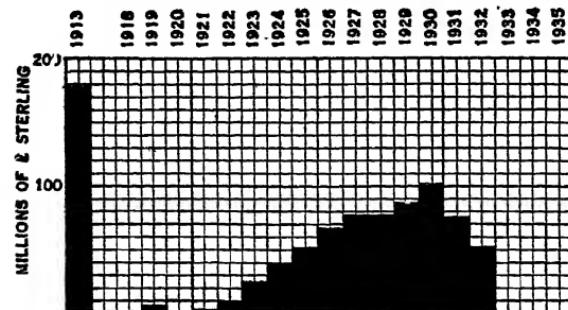


FIG. 150.—The exports of Russia in recent years—value expressed at 1913 prices (approximate). 1933, 50 £mn; 1934, 42; 1935, 40.

shows the variation in the export trade of Russia in recent years, and how it has suffered from the revolution. Formerly Russia occupied a very important place as a supplier of foodstuffs and raw materials.

In the period 1909–13 Russia was the world's leading exporter of wheat, oats, barley, maize, timber, and flax, and ranked second in butter. During the war and revolution her place was taken by such countries as Canada, the United States, Argentina, Australia, and New Zealand. Whether

EXPORTS 1927-28												
RAW MATERIALS												
FUR SKINS	OILS	TIMBER	EGGS	BUTTER	SUGAR	CEREALS	OTHER FOODS	MANS.	WOOD	COTTON	VARIOUS	
10	20	50	40	50	60	60	70	80	90	100	100	
RAW COTTON	WOOL	METALS	HIDES & SKINS	MANUFACTURES		IRON & STEEL	VARIOUS					
RAW MATERIALS												

IMPORTS 1927-28											
RAW MATERIALS											
FUR SKINS	OILS	TIMBER	EGGS	BUTTER	SUGAR	CEREALS	OTHER FOODS	MANS.	WOOD	COTTON	VARIOUS
10	20	50	40	50	60	60	70	80	90	100	100

FIG. 151.—The Trade of U.S.S.R.

Russia, despite her attempt to lower prices of exports such as timber by using forced labour, can ever take her pre-war position remains to be seen. The main items entering into foreign trade are shown in Fig. 151.

THE BALTIC STATES

Along the east coast of the Baltic Sea, south of the Gulf of Finland, are three small republics, which are now usually known as the Baltic States. Before the Great War of 1914–18 they formed part of the Russian Empire, but since the war they have been independent. Unlike Finland, which consists largely of old, hard

rocks from which the ice-sheet removed most of the soil, the three Baltic States belong more especially to the great European Plain, and like the neighbouring parts of Russia, the land is everywhere flat, and is usually thickly covered by glacial sands and clays. The climate is essentially continental, like that of the neighbouring parts of Russia. The winters are very severe, and ice forms over the sea in enclosed bays such as the Gulf of Riga, but the ports on the open Baltic can be kept free of ice, a fact which is important.

Estonia.—This republic lies to the south of the Gulf of Finland. Until 1621 the Estonians were subjects of Sweden, but from 1621 to 1917 the country was under the government of Russia. The total area of the country, 18,353 square miles, is less than two-thirds of that of Scotland, and the population is only a little over a million. Agriculture and dairy farming are the chief occupations of the people, and about 70 per cent. work on small holdings. Nearly a quarter of the land is forested, but most of the remainder is cultivated or used for pasture. The climate is too severe for wheat. Rye, oats, barley, and potatoes form the principal food crops. Flax is grown and exported, but the chief exports are dairy produce, timber, and paper. Of considerable importance is the textile industry, raw cotton being imported and cotton goods exported. The capital is *Tallinn*, or *Revel*, situated at the mouth of the Gulf of Finland, and is a considerable town of over 136,000 inhabitants. *Tartu*, or *Dorpat*, is a university town.

Latvia.—This republic is rather larger than Estonia, and, with 25,000 square miles, may be compared in size with the Irish Free State. It is inhabited chiefly by Latvians, or Letts, who represent roughly three-quarters of the total population of 1,900,000. Latvia again is mainly an agricultural country, but an increasing number of people are passing from agricultural to industrial occupations. The principal crops according to the area are oats, rye, wheat, barley, potatoes, and flax, but the staple exports are timber, butter, and flax; furthermore, the Latvian flax crop averages about £35,000 per annum. The capital is *Riga*, an important town with a population of 340,000; it is a port at the head of the Gulf of Riga on the western Dwina, and used to be one of the main outlets for northern Russia. Much of the produce of Russia must still pass through Riga. The railways of Russia are of a broader gauge than those of the rest of Europe, but from Riga one can travel right through to France or Holland without changing train, whereas the Russian broad gauge extends from Riga to Moscow. Unfortunately, Riga, being in a gulf, is blocked by ice for many months in the year. Fortunately, the other two chief towns, *Liebaja* (*Libau*) and *Ventspils* (*Windau*) are both open nearly the whole year.

Lithuania.—This republic lies to the south of Latvia, with which it agrees in general character. The Lithuanians claim that

the capital of Lithuania is Vilnius, or Vilna, but this town is at present in Poland, and the present seat of the Lithuanian government is Kaunas, or Kovno.

Lithuania has only a very short coastline, but possesses now the important port of Klaipeda, or Memel. Lithuania is again a predominantly agricultural country; the crops resemble those of Latvia, and again the chief articles of export are meat, dairy produce, timber, pulp, flax, and linseed. It should be noted that doubt still exists as to the economic stability of these three small and naturally rather poor countries situated on the Baltic.



FIG. 152.—The Baltic States.

POLAND

The old kingdom of Poland has again become independent as a republic. It was once an important country of Europe, but before the Great War was occupied by Germany, Russia, and Austria-Hungary. Poland is an example of a state with few natural or geographical boundaries. It consists mainly of flat land, and fades eastwards into Russian territory, westwards into Germany. But the country is an ethnic unit, and the Poles are proud of their nationality, and are determined to secure prosperity for their country once more. Running through the centre is the great highway, the River Vistula, leading to the natural outlet of the country in the port of Danzig. But Danzig, with its large German population, has been made a free city, open to all nations equally. Poland has built her own port near by at Gdynia, which has grown with incredible rapidity, and since 1933 has had a larger tonnage of ships cleared than Danzig.

Poland has an area of about 140,000 square miles and a population of 32,000,000. Sixty-nine per cent. of the population is Polish, 11 per cent. Red Russian (Ruthenian), and nearly 10 per cent. (over 3,000,000 persons) Jewish. The greatest difficulties in determining the frontiers of Poland were encountered in the coalfield of Upper

Silesia. Here, on the whole, the towns such as Katowice (128,000) and Krolewska Huta or Königshütte have a large German population; the rural areas are Polish. The Poles are primarily agriculturalists: farming and forestry claim two-thirds of all the people of the country. The whole of Poland except the southern fringe on the slopes of the Carpathians lies on the European Plain, so what has been said concerning the structure, glacial deposits, soils, climate, and agriculture of the plain applies especially to this country. The climate is sufficiently continental in character for the rivers to be frozen for several months of the year.



FIG. 153.—Poland.

The country is divisible physically into four unequal east to west strips, but it must be remembered that culturally the division of the country is rather into north-south strips with German influence predominating in the present day culture of the west, Russian in the east. The physical divisions are as follows:

The Lake Country of the extreme north-west and north-east. This is glaciated country lying within great frontal moraines where numerous lakes occupy hollows in the mantle of glacial deposits. In the north-east is *Wilno* (Vilna), claimed also by Lithuania.

The Great Central Plain of Poland is essentially agricultural country, but the whole was glaciated and the character of the agriculture depends mainly on the local character of the glacial deposits (see p. 6). There are extensive sandy ridges (terminal moraines) covered with heathland vegetation (sometimes a source of danger owing to moving sand dunes) which have however been largely afforested (as in Germany). There are huge stretches of rolling farm land where the chief crops are rye, oats, barley, potatoes, sugar-beet, flax and fodder. The climate is somewhat severe for wheat. There are low numbers of cows and pigs also—the basis of the Polish export of bacon and dairy produce. These are often on the damper ground of the broad old river valleys—the *pradoliny* of the Poles. The natural highway of the whole country, the Vistula, passes through the middle of this country and the capital, *Warszawa*, or *Warsaw*, is well placed. It was originally founded on a hill on the west bank of the Vistula, where it commanded both north-south and east-west routes, and was not liable to flooding, but has since spread into lower ground (population exceeds 1,000,000) and has become a great railway junction also with fine bridges across the river. There is considerable river traffic on the Vistula, especially below Warsaw. Warsaw has developed iron, steel, leather and textile industries. The centre for the western part of the plain is *Poznan* (German *Posen*). On the German frontier are considerable marsh stretches (*Posen* marshes), but these are insignificant when compared with the vast Pripet or *Pinsk* marshes of the eastern border. This is one of the remotest areas of Europe: naturally covered with a swamp woodland, it has been partly cleared, and good grazing land developed. The centre is *Pinsk*. Apart from these main marshy areas there are other tracts of peaty water-logged boulder clay and other areas rendered sterile by their hungry sandy soils—sometimes extensively forested. There are sugar factories and saw mills in various parts of the plains.

The Plateau Region comprises a low plateau largely built up of chalk, but with islands of older rocks. Nearly the whole is covered with a mantle of rich loess, so that this is agriculturally very fertile agricultural country. The south-east is a continuation of the Russian Ukraine. *Lodz*, the cotton manufacturing centre, lies south-west of Warsaw and *Lublin* is another manufacturing centre south-east of Warsaw.

The Carpathian Region of the South comprises the forested mountains and their foothills (with some pleasant resorts) and a sub-Carpathian trough. Along the foothills are oilfields, notably at *Boryslaw* near *Lwow*. The trough has long formed a routeway; at its eastern end is *Lwow* (German *Lemberg*), to the west on the Vistula and guarding the old road to Central Europe and Italy is *Krakow*.

In the extreme south-west is the Silesian coalfield from which Poland mines 30,000,000 tons of coal a year (of which a considerable part is exported) and carries on heavy industries, including iron and steel.

Trade of Poland.—Poland exports timber, wood-pulp and paper, coal and zinc, pigs, bacon, and eggs, sugar, cereals, cotton goods, and mineral oil. A very large proportion of the trade is with

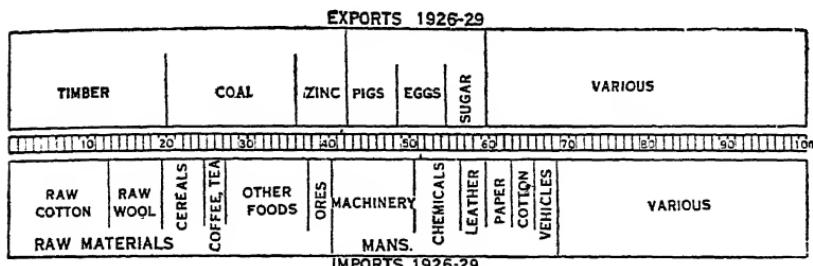


FIG. 154.—The trade of Poland.

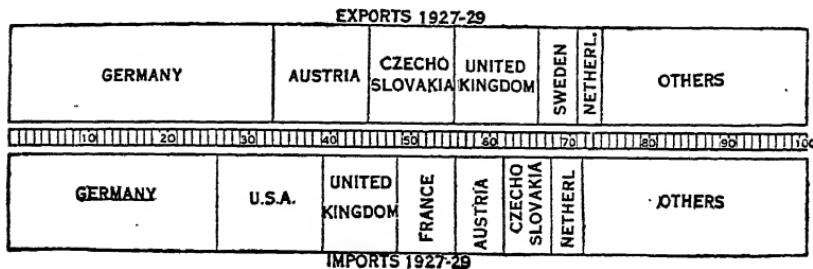


FIG. 155.—The direction of the trade of Poland.

Germany, but the timber is exported, *via* Danzig or Gdynia, largely to Great Britain. Raw cotton heads the list of imports, followed by machinery, apparel, raw wool, and wheaten flour.

GERMANY

Position and Size.—Since November 9th, 1918, Germany has been a republic. The present area of the country is 181,000 square miles with a population in 1933 of nearly 65,150,000. These figures do not include the Saar district with an area of 738 square miles and a population of 826,000. The European territory of the German Empire before the war was 27,250 square miles greater than after the Treaty of Versailles, the principal losses being Alsace-Lorraine (5,600 square miles) to France and 17,800 square miles to Poland. The ceded territories had a population of about $6\frac{1}{2}$ million. In 1938 Germany absorbed Austria (32,400 square miles; population, 6,760,000) and so became the largest and easily the most populous country of Europe outside Russia (see p. 44A).

Physical Features.—Germany falls into two main divisions :

(a) The North German Plain, part of the great European Plain, covered by a thick mantle of glacial clays and sands.

(b) The Southern Highlands and Alpine Foreland, a varied complex of plateaus, hills, low mountains, and valleys, occupying the southern half of the country and sloping, on the whole, northwards from the Alps.

Almost as fundamental as this division of Germany into two halves, a northern and a southern, is the division of the country into the great river basins. The four chief rivers all flow northwards or north-westwards: the Oder to the enclosed Baltic; the Elbe, Weser, and Rhine to the North Sea. Three of these—the exception being the Weser—rise outside Germany and flow right through the country. With the exception of parts of the north coast



FIG. 156.—Germany.

and East Prussia, nearly the whole of Germany lies in the basins of these four great rivers, and in each case the river forms the main artery of the basin through which it flows. The principal navigable rivers, and the canals by which they are joined, are shown in Fig. 45. It is unfortunate for Germany that the finest of her rivers, the Rhine, enters the sea through Holland. But fortunately both the Elbe and the Weser, which might otherwise flow into the land-locked Baltic, have been deflected westwards by the presence of morainic ridges.

Geology and Minerals.—The solid rocks which must make up the floor of the North German Plain but rarely emerge from beneath the thick mantle of glacial deposits, and hence it is the latter

which determine the character of the surface. As in the Baltic lands and Poland, the soil afforded is not naturally fertile; ridges of coarse sand which mark stages in the retreat of the ice sheet and which, incidentally, with a N.W.-S.E. trend, have influenced the direction of the German rivers to a marked degree alternate with water-logged tracts overlying the areas of clay (see pp. 5-6).

Southern Germany is, geologically speaking, a complex area. The plateau regions are built up of sedimentary rocks, the more rugged areas either of masses of old rocks (Vosges, Black Forest, Thuringian Forest, Ore Mountains or Erz Gebirge, Harz Mountains, and the massifs on either side of the Rhine gorge), or of volcanic masses of comparatively recent date (the Eifel, Vogelsberg, etc.). Geologically and geographically the rift valley of the Upper Rhine is an interesting and remarkable area. Economically the coalfields are the most important parts of South Germany, but the density of population is high on many parts of the plateau owing to the fertile soil, sheltered valleys, and minerals.

Mining industries employ about 800,000 persons in Germany, and among European countries Germany ranks after the United Kingdom in value of her mineral production: the principal minerals are coal, lignite, iron ore, zinc, lead, and copper ores, rock salt and potash salts.

Coal.—The output of coal in Germany has increased very rapidly since the War (119 million metric tons in 1924; 154 in 1927, and 163 in 1929¹). More than 90 per cent. of the coal is raised in Prussia (in the coalfields of the Ruhr, Rhineland, and Westphalia; Upper Silesia, and the smaller field of Lower Silesia). The important Saar field was restored to Germany in 1935. There is a production of about 4,000,000 tons from Saxony.

Lignite.—Lignite, or brown coal, assumes a much greater importance in Germany than in most countries of the world. The production in 1925, 1926, and 1927 was nearly 140,000,000 metric tons. In 1929 it reached over 174 million metric tons; in 1930, 146; in 1934, 137. According to German practice 9 tons of lignite are considered equivalent to 2 tons of bituminous coal, so that Germany's output of lignite is equivalent to 30,000,000 tons of coal. The lignite fields lie mainly in Saxony and Prussian Saxony, the Thuringian states, and on either side of the Rhine above Cologne. The value of the lignite has been greatly enhanced by using it on the spot for the development of electrical power. Mineral oil (of which Germany has naturally only small quantities, in Hanover) is also obtained from lignite.

Iron Ore.—Having lost the great Lorraine fields, Germany's principal home supplies of iron ore are the Siegerland deposits in the valley of the Sieg, a tributary of the Rhine. These ores have a

¹ *Statesman's Year Book*. 143 in 1930; 119 in 1931; 105 in 1932; 110 in 1933.

high iron content and are rich in manganese. They are smelted in the Ruhr. Even before the War, the Ruhr iron industry, through using Lorraine ores, was becoming more and more dependent on supplies imported from Sweden and Spain. Other iron ore deposits are mined in Silesia and near Hanover.

Zinc and Lead are obtained in Silesia and in the Rhine Province near Aachen. The chief Silesian deposits are now in Poland and some of the Rhine deposits lay in the strip of territory transferred to Belgium. Copper is produced chiefly in the Harz, at Mansfeld. The deposits of the Ore Mountains (Erz Gebirge) are much less important than formerly.

Salts.—The chief salt-producing district in Germany is in the Prussian province of Saxony. The potash salts of Stassfurt in this region which overlie a bed of pure rock salt are very important and have made Stassfurt one of the leading seats of chemical industries in the world.

Climate.—The climate of Germany is intermediate in character between the oceanic climate of North-West Europe and the continental climate of Poland and Russia. The bulk of the country lies in the region of the "Central European type." Broadly speaking, as one goes from west to east the winters become colder and the summers warmer. In Southern Germany, aspect is important, and many of the valleys, including the Rhine Rift, have comparatively mild winters, permitting the cultivation of the vine (see p. 213).

Vegetation.—The higher hills and mountains are clothed with valuable coniferous forests, and forestry in Germany is an industry of great importance, conducted under the care of the State on scientific lines. The 1933 forest area was 31.6 million acres, of which 22.5 million were coniferous and 9.1 million oak, birch, ash, beech, etc. (see pp. 29 to 32).

Agriculture.—Of the present extent of Germany arable land covers 51½ million acres, or rather under 45 per cent.; pasture and meadow land 20 million acres, or 17 per cent. Hay, rye, oats, potatoes, wheat, barley, and sugar-beet are the chief crops.

Hay crops cover nearly a third of the arable land.

Rye is by far the most important cereal crop and occupies nearly a quarter of the cultivated land—more than the combined acreage under wheat and barley. This is, in large measure, an indication of the poverty of the soil in Northern Germany.

Oats are extensively and widely grown, but *wheat* and *barley* are mainly crops of Southern Germany. The average yield is lower than in the United Kingdom.

Potatoes are important in Germany as a source of industrial alcohol. This accounts for the fact that they occupy ten times the acreage in Germany that they do in the United Kingdom.

Sugar-beet is a crop of the greatest importance, especially in

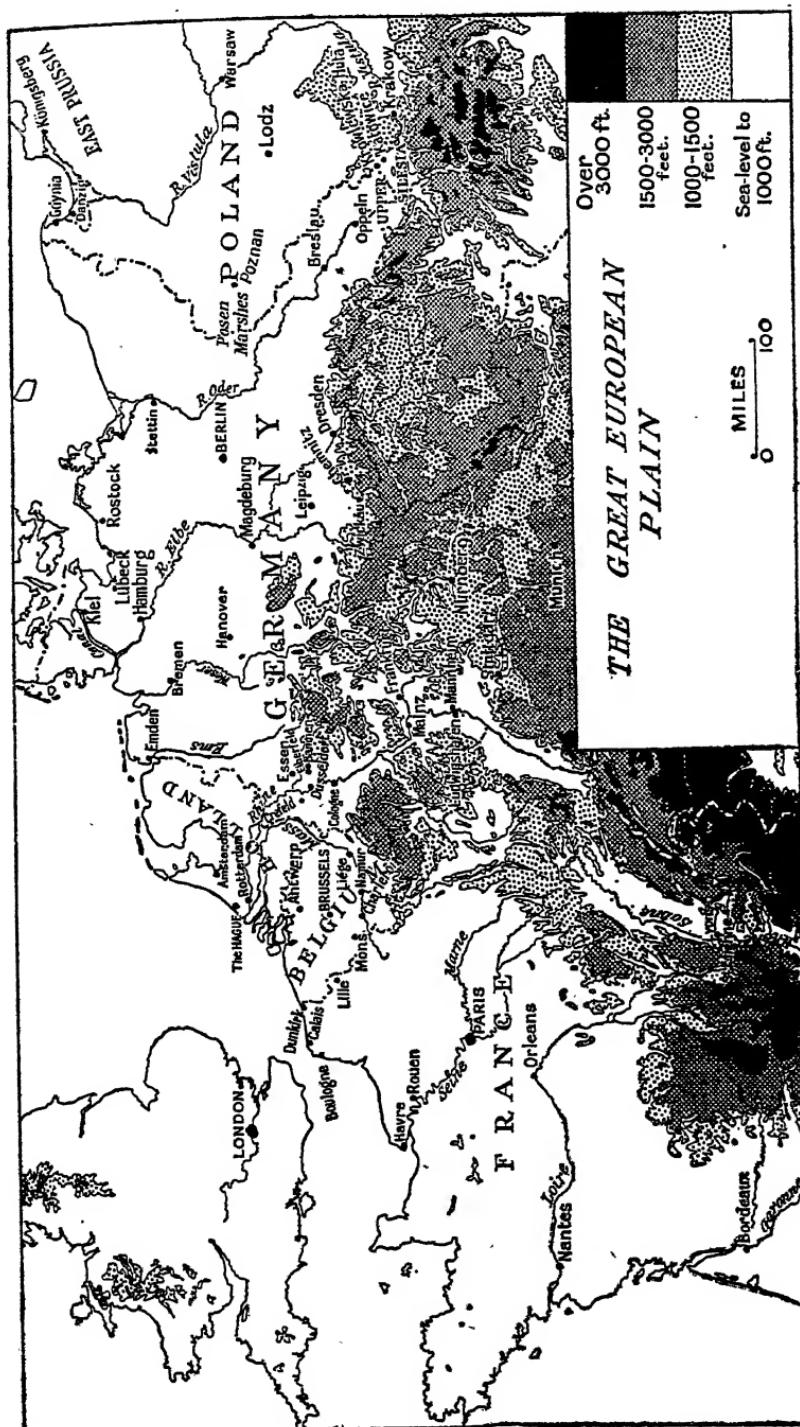


FIG. 157.—General map with ports and hinterlands.

central Germany around Magdeburg, and Germany is the premier beet-sugar producer in the world. The production of sugar was 1·6 million tons in 1925–26; 1·43 million tons in 1933–34. Other crops not mentioned above include hops (especially in Bavaria), tobacco (about 30,000 acres yielding over 70,000,000 lb. in 1933), the vine and fruits.

Domestic Animals.—Germany has over 19,000,000 cattle, or more than double the number in the United Kingdom. By way of contrast there are less than 4,000,000 sheep, but over 23,000,000 pigs and 2,500,000 goats (1934). The numbers of horses are decreasing as in other parts of the world.

Fisheries.—Germany shares to a considerable extent in the North Sea fisheries, the catch in 1933 totalling 350,000 metric tons against 35,000 from the Baltic fisheries.

Population.—Out of her total population of 66 millions the bulk are classed as urban, and in this respect Germany bears comparison with Great Britain. Berlin has over 4 million inhabitants, Hamburg over 1 million (compare Greater London with 7·8 millions and Liverpool with Birkenhead over 1 million). There are no less than 44 other towns with over 100,000 inhabitants and 216 others between 20,000 and 100,000. There is the marked concentration on the coalfields as in Britain, but again the metropolis lies away from any coalfield.

Manufactures.—Industrial establishments employ no less than 12½ million actual workers, thus indicating that Germany is now predominantly a manufacturing country, though the great development of the country did not begin until the seventies of last century when the federation of the German States and the receipt of an indemnity of £200,000,000 from France after the Franco-Prussian War afforded the necessary stimulus.

Iron and Steel.—The chief seats of the German iron production are the Ruhr, the Saar, and Upper Silesia; to a smaller extent in Bavaria, Hanover, and Saxony. Remarkable progress has been made in engineering and shipbuilding industries—the latter at Stettin, Hamburg, Kiel, Lübeck, and Rostock.

Textiles.—The textile industries give employment to two million people, and the clothing industries to rather more. The various branches of the textile industry are much more widely distributed and less localized than in the United Kingdom. Thus *Barmen* and *Elberfeld* on the Ruhr coalfield carry on all branches of the textile industry, *Chemnitz* is the "Saxon Manchester," but also manufactures other textiles than cotton as well as machinery. The great German cotton market and place of import of raw cotton is *Bremen* on the Weser.

Chemicals and Electrical Apparatus.—The advanced state of technical education in Germany was largely responsible for the

pre-eminence attained in these characteristically German industries—a pre-eminence still largely maintained.

Sugar-refining and Brewing are two industries connected with German agriculture. Other industries will be noted later in connection with the regions in which they are developed.

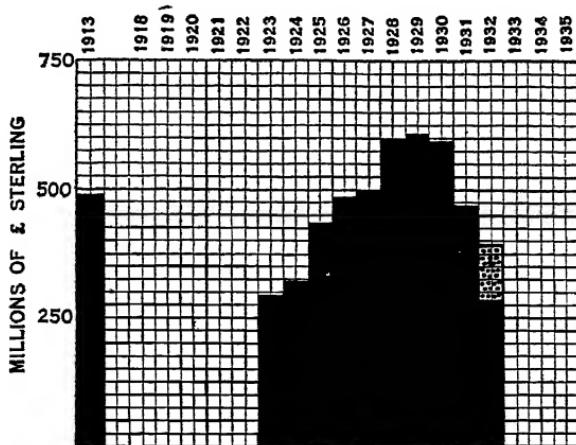


FIG. 158.—The exports of Germany (excluding gold and silver) (converted at 20·43 marks=£1 ; dotted area=total converted at current rate of exchange).

1933, 4,871 mn marks ; 1934, 4,166 ; 1935, 4,269 ; 1936, 4,770.

Expressed at 1913 values the exports in 1926 were worth 72 per cent., and those in 1927 75 per cent. of the total in 1913.

Communications.—Mention has already been made of the importance of German waterways—nearly 6,000 miles of rivers or canalized rivers, and nearly 1,400 miles of canals. In 1933 over 78,000,000 tons of merchandise were carried on the inland

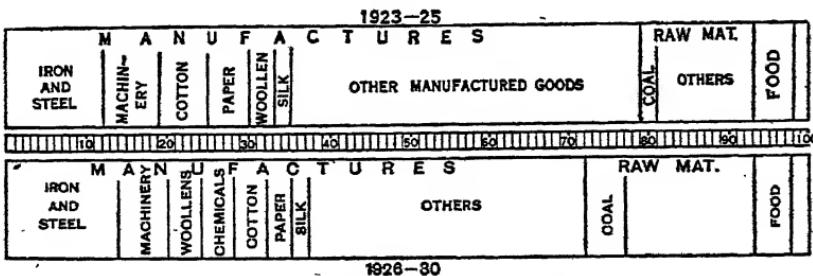


FIG. 159.—The exports of Germany.

Some of the iron and steel should, strictly speaking, be included under raw materials. The bulk of the "food" exported is beet sugar.

waterways, compared with 365,000,000 tons carried on the railways. This is an interesting contrast with the state of affairs in Great Britain. Germany has 36,000 miles of railways.

Ports.—The marked division of Germany into four great river basins has already been noted. Each river basin has one or more

great ports serving as its outlet. *Hamburg* is the greatest of them all, and serves primarily the Elbe Basin, including Saxony and also a large part of Czechoslovakia. *Bremen* serves the Weser Basin, *Stettin* (to a less extent) the Oder Basin. An attempt has been

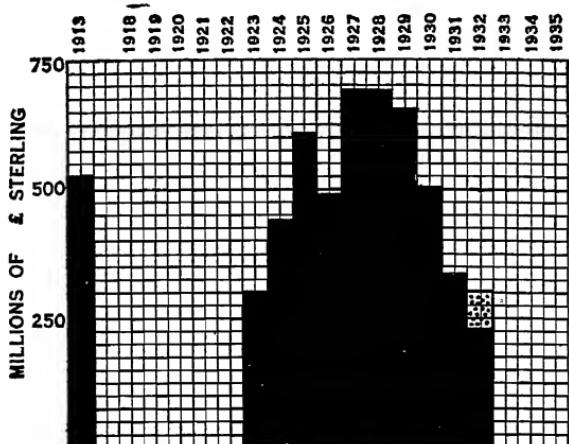


FIG. 160.—The imports of Germany (excluding gold and silver).

1933, 4,204 mn marks; 1934, 4,451; 1935, 4,158; 1936, 4,221.

1923-25

RAW MATERIALS										FOOD										
COTTON	WOOL	COAL	HIDES & SKINS	WOOD	TOBACCO	COPPER	MIN. OILS	OTHERS	GRAIN	FRUIT	LAND & MEAT	BUTTER	COFFEE	Eggs	OTHERS	COTTON GOODS	MANS. IRON	WOOL YARN	OTHERS	VARIOUS
10	5	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	
OIL SEEDS AND CANE	R AW M A T E R I AL S	COTTON	HIDES & SKINS	WOOD	COPPER			OTHERS	GRAIN	FRUIT	LAND & MEAT	BUTTER	COFFEE	Eggs	OTHERS	COTTON GOODS	MANS. IRON	WOOL YARN	OTHERS	VARIOUS
D																				

RAW MATERIALS										FOOD										
OIL SEEDS AND CANE	R AW M A T E R I AL S	COTTON	HIDES & SKINS	WOOD	COPPER	MIN. OILS	OTHERS	GRAIN	FRUIT	LAND & MEAT	BUTTER	COFFEE	Eggs	OTHERS	COTTON GOODS	MANS. IRON	WOOL YARN	OTHERS	VARIOUS	
10	5	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	
D																				

FIG. 161.—The imports of Germany.

Note.—Butter=Butter and margarine.

1926-30

EXPORTS 1926-30																		
UNITED KINGDOM	NETHER- LANDS	U.S.A.	FRANCE	SWITZERLAND	CZECHO- SLOVAKIA	ITALY	U.S.S.R.	BELGIUM	SWEDEN	DENMARK	NETHER- LANDS	CHINA	AUSTRALIA	U.S.S.R.	ARGENTINE	POLAND	OTHERS	
10	20	50	40	60	50	50	50	50	50	50	50	50	50	50	50	50	50	50
U.S.A.	UNITED KINGDOM	ARGENTINE	NETHER- LANDS	FRANCE	CZECHO- SLOVAKIA	BELGIUM	ITALY	U.S.S.R.	DENMARK	SWEDEN	NETHER- LANDS	SWITZERLAND	CHINA	AUSTRALIA	CANADA	SPAIN	OTHERS	
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

IMPORTS 1926-30

FIG. 162.—The direction of German foreign trade.

made, by constructing the Ems-Dortmund Canal, to make Emden the great port of the Rhine Basin, but the bulk of the foreign trade of the Rhine Basin still flows through Holland *via* the ports of Amsterdam and Rotterdam, and to a less extent *via* the Belgian port of Antwerp.

Foreign Trade.—The predominance of raw materials and food-stuffs amongst the imports is immediately noteworthy ; and of manufactured goods among the exports. Sugar accounts, as shown in Fig. 159, for a considerable proportion of the “food-stuffs” exported. For the position occupied by Germany in the export and import trade of certain leading commodities, see pp. 15 and 16.

The Natural Regions of Germany

The marked difference between the Great Plain of Northern Germany and the highlands of Southern Germany is easily recognized, but the division of the latter into natural regions presents some difficulty, and may perhaps best be made on a basis of river basins, or by separating first of all the coalfields and industrial regions. The scheme given below is an outline scheme only.

The North German Plain is essentially an agricultural region. In many places the soil is dry and sandy, especially along the forested ridges (the Baltic Heights) which border the Baltic Sea, but has been carefully cultivated ; in other places marshes and bogs have been drained, so that now more than half the plain is cultivated, a quarter used for cattle-grazing, and most of the remainder is woodland. The most important grain is rye, next comes oats, but wheat will only grow in a few places where the soil is richer. Large areas are used for potatoes (from which alcohol is made) and sugar-beet. Germany produces more beet-sugar than any other country.

Agriculturally the richest tracts are along the southern border of the plain, where it commences to fade into the hills of Saxony or into the Silesian Basin, where rye gives place to wheat, and where are the foci of sugar-beet cultivation.

Berlin, the capital of Germany, lies in the heart of this region ; from it all parts are easily reached by rail. On the Baltic Sea are the ports of *Königsberg*, serving East Prussia ; *Stettin*, engaged in shipbuilding ; *Lübeck* and *Kiel*, the latter at the Baltic end of the Kiel Canal. The Baltic seaports suffer by being blocked by ice in winter. Generally speaking, the Baltic coast of Germany is a shallow, shelving coast, and the large lagoons, called hafis, by which it is fringed are usually too shallow to be used by large vessels. It is the short length of North Sea coast which is of primary importance to Germany and emphasizes the significance of *Hamburg*. By far the largest port of Germany, Hamburg is more than the outlet of the Elbe Basin, which it primarily serves. *Bremen*, on the other hand, is mainly the outlet of the Weser Basin, including Hanover. The significance of *Emden* and the Ems-Dortmund Canal has already been emphasized.

Apart from Berlin, the large inland centres of the North German

Plain are nearly all situated along the richer agricultural southern margins—Hanover, Magdeburg, Leipzig, and Breslau.

The Rhenish-Westphalian Industrial Region, including the Ruhr coalfield. The great industrial region of the Lower Rhine has a detached area around Aachen (Aix-la-Chapelle) where the extremity of the great coalfield of Belgium lies in German territory, but the main part of the region lies along the banks of



FIG. 163.—The industrial regions of the Lower Rhine.

The lined areas are the coalfields; the approximate limits of the industrial regions are marked by a dotted line.

the Rhine from Cologne to Ruhrort and on the great Ruhr coalfield. Iron and steel may be regarded as the basic industry of the region, and is carried on especially at Essen, along the narrow valley (the Enneperstrasse), between Barmen and Hagen, at Dortmund, Düsseldorf, and Duisburg. Remscheid and Solingen are the

centres for cutlery steels. The textile industries are concentrated at Barmen and Elberfeld (woollens, silks, etc.), Crefeld (silks and velvets), Aachen (woollens), Dusseldorf, Munch Gladbach (linen, cotton, woollens), Duisburg, at the junction of the Ruhr and Rhine, carries on shipbuilding, but the great river town is the bridge town of Cologne engaged in a great variety of manufactures, including textiles, machinery, scent, cocoa, and chocolate.

The Rhine Gorge Massifs.—Between Mainz and Bonn the Rhine flows through its famous gorge, with mountainous massifs of old rocks flanking it on either side. On the west are the Hunsrück and the Eifel—separated by the valley of the Moselle—on the east are the Taunus, Westerwald, and Sauerland. In the valley of the Sieg lie the iron ore deposits of Siegen. The mountains are largely forested, but in the sheltered Moselle valley, as well as in the Rhine valley itself, the vine flourishes. Coblenz is a large town at the junction of the Moselle and Rhine.

The Rift Valley of the Rhine.—Between the Swiss frontier and Mainz, the Rhine flows through a broad, fertile valley forming a rich agricultural region where barley, wheat, tobacco, the vine, and fruits are leading crops. West of the Rhine, part of this plain lies in France; east of the Rhine its limits are sharply defined by the heights of the Black Forest. With this region may be grouped the fertile lower valleys of the Neckar and Main. Industrial centres have grown up at Frankfurt (machinery, chemicals, brewing); Mainz (leather, machinery); and Ludwigshafen-Mannheim is an important distributing centre at the junction of the Neckar and Rhine.

The Bavarian Uplands.—With the exception of the Rhine valley the whole of south-western Germany is occupied by a great stretch of upland, nearly all over 1,000 feet above sea-level, lying between the Black Forest on the west and the Bohemian Forest on the east, and extending from the Alpine foreland on the south to the Thuringian Forest, the Harz and the Rhine massifs, already mentioned, on the north. Naturally, this large area varies greatly. The hillier parts are usually clothed with valuable coniferous forest, interrupted in some areas by hill pastures supporting numbers of sheep, and along the Alpine foreland by an extensive dairying tract. The less rugged parts have good soils and enjoy a better rainfall than is found in Northern Germany, with the result that barley, oats, and wheat are grown in large quantities. The sheltered valleys are the richest regions; those of the Neckar, Main, and Upper Danube deserve special mention. Munich is celebrated for its beer, but both Munich and Nürnberg are examples of towns not well situated in relation to coal, raw materials, or communications, which have developed important industries in the manufacture of small articles requiring little raw material—toys, pencils, electrical

apparatus, instruments. It is obvious that the development of the first two has been influenced by the local supplies of suitable wood; the economic factor is evidenced in the manufacture of metal toys which followed that of wooden toys. Stuttgart, the chief town of the Neckar Valley, manufactures hosiery and cotton goods, and has a large printing trade.

The Franconian Jura, which run obliquely across the great upland tract, are sometimes separated as a distinct region.

The Harz Mountains and Surrounding Region.—The Harz Mountains are forested, but the low hills of Brunswick and Hanover by which they are flanked on the north form a rich agricultural area in which sugar-beet, wheat, and fruit are particularly important, and which has already been noted as lying on the southern side of the great German plain.

The Saxony Industrial Region.—Primarily Saxony is a rich agricultural region with sugar-beet, wheat, barley, rye, oats, and potatoes as leading crops and belonging to the rich agricultural belt which flanks the great German plain on the south. The presence of basins of bituminous coal around Zwickau, Chemnitz, and near Dresden, and of lignite in several basins further north has, however, been largely responsible for the industrialization of much of the region. The textile industry was favoured at an early date by the supplies of wool from the sheep pastures on the slopes of the Erz Gebirge; the minerals (not now of great importance in the Erz Gebirge) and forests of the mountains afforded other supplies of raw materials. Woollen manufactures are still carried on, but Saxony has become the great seat of cotton-working in Germany, with Chemnitz and Zwickau as the leading centres. The famous Dresden china is actually made now at Meissen, Dresden being concerned rather with machinery. In the north of Saxony, on the borders of the plain, lies Leipzig, a famous old centre of trade (symbolized by the Leipzig Fair) and learning (symbolized by its printing and publishing trade).

The Silesian Industrial Region.—Two-thirds of the great upper Silesian coalfield now lies in Poland, and Germany has lost the great centres of Königshütte and Kattowitz, but retains Beuthen, Gleiwitz, and Ratibor. The first two are iron and steel towns, the last manufactures paper. Apart from the manufacturing region, Silesia is a rich agricultural and dairying region, belonging again to the rich belt which flanks the German plain on its southern side.

AUSTRIA. The small republic of Austria existed from 1918, after the Great War, until 1938 when it was absorbed into the German Reich. It is only a little larger than Scotland, and with a population (6,500,000) less than that of greater London. Austria shares with Switzerland the distinction of being almost entirely a mountainous country. Certain other comparisons with Switzerland

are possible. A rough threefold division of the country is possible :

(a) The eastern part of the Alpine system (the Austrian Tirol and Dolomites) occupies three-quarters of the whole.

(b) The valley of the Danube, the most important part of the country, is comparatively narrow and hilly. In the east, just where the Danube leaves the mountains and enters the Hungarian Plain, lies Vienna.

(c) The hills to the north of the Danube lie along the Czechoslovakian border.

Fig. 171 shows the uses to which the surface of the country is put. Even including Alpine pastures, less than half the whole is under crops and pasture, but more than a third of the whole is forested. It follows that Austria was not self-supporting in the matter of foodstuffs, but considerable progress was made from 1923 to 1938. In 1923 imports of milk and dairy produce were twenty times as great as exports ; in 1929 exports of these commodities exceeded imports. In the mountainous areas the hay crop is important, gathered from tiny fields perched high on the mountain sides, cut by hand, and then transported on the backs of donkeys. In the Danube valley there are considerable crops of corn, potatoes, and, amongst others, sugar-beet. There is growing recognition of the value of the forests, and the Austrian paper-mills are steadily increasing their output, so that paper, wood-pulp, and pasteboard came to figure fourth amongst the exports.

Austria has little or no good coal, but water-power can be developed from mountain streams. Between 1923 and 1930 the horse-power of hydro-electric installations was doubled, and the railways, as in Switzerland, are now largely electrified.

Austria has also some important mineral deposits, comparatively little exploited—iron ore is the most important ; copper ore, lead ore, and lignite are also mined.

Two things result essentially from the geographical situation of Austria. From its central position and the attractive mountain scenery, Austria may well rival Switzerland as a playground of Europe, and Austria has everything to gain from the further development of its tourist industry, of which *Innsbruck* is at present the leading centre.¹ *Vienna* rivals Geneva as a meeting place of routes ; when Vienna was the capital of the old empire, it was a very fine and flourishing city. Though for a time it seemed a "misfit," as the capital of a small republic, it is steadily regaining its reputation as an international centre of learning and the arts, and more than a quarter of all the people of the country live in Vienna. In the second place, Austria must, for the same reasons

¹ Innsbruck, Linz, Salzburg, Graz, and Mariazell are each visited annually by more than 100,000 tourists, Vienna by more than half a million.

as Switzerland, concentrate on the manufacture and export of goods requiring a large amount of skill, and a comparatively limited amount of raw material. This is exemplified in the manufacture of scientific instruments and electrical machinery, and the fact that manufactures represented 75 per cent. of all exports, and that a third of all the people are engaged in manufacturing. The principal urban centres in the valley of the Danube or its tributaries are Linz (machinery and textiles), Steyr (iron and steel works), and Salzburg.

DENMARK

Denmark is a very small country, with an area of 16,600 square miles and a population of 3,550,000. It consists of the low peninsula of Jutland and a group of islands in the Baltic Sea. The whole land

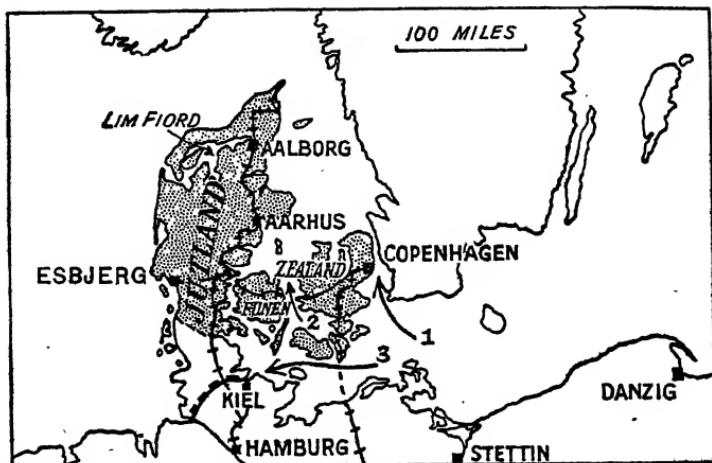


FIG. 164.—Denmark.

The routes marked 1, 2 and 3 show the three chief approaches from the Baltic to the North Sea. The small island east of the figure 1 is also Danish.

is very flat, and there is no hill more than a few hundred feet high. Much of the western coastal tract is covered by sand dunes thrown up by the sea, and there is a considerable proportion of waste land. Forests have been planted to prevent the sand from blowing inland. Although not naturally fertile, no less than three-quarters of the surface of Denmark is cultivated; the yield of crops is very high (sometimes the highest in Europe) and the quality good. Denmark is thus essentially an agricultural country and especially a dairy-ing country. There are over 3,000,000 cows, 5,450,000 pigs, and nearly 20,000,000 hens in the country (1931). The principal products are butter, cheese, bacon, and eggs. Although the country is so small and has no minerals (except limestone for cement and clay for porcelain), no coal, no water-power, and only a poor soil, it is rich and prosperous because of the care with which the people work the land. The success of its agriculture is undoubted-

due in a large measure to the high state of education of the farmers and to the co-operative system among them encouraged by the government. There are many factories, but they are nearly all connected with agricultural products—there are factories for making butter and cheese, sugar from sugar-beet, beer from oats and barley, and for the manufacture of margarine. There are good fishing grounds on the shallow west coast, and young fish are hatched in the “Lim Fiord.” The fishing centre and west coast port is

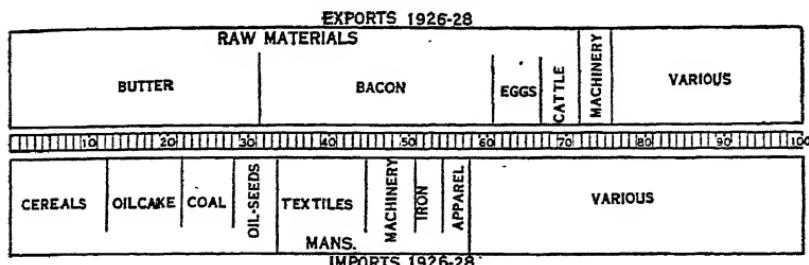


FIG. 165.—Trade of Denmark.

Esbjerg. The principal town and port is *Copenhagen*, with half a million people, controlling the narrow entrances to the Baltic Sea. Denmark has a well-organized system of railway communications, in which an essential part is played by the train ferries between the islands, and the islands and the mainland. The foreign trade of Denmark is considerable, having averaged at par rate of exchange over £200,000,000 in recent years. Butter alone represents one-third of the exports, bacon more than a quarter, eggs about 8 per

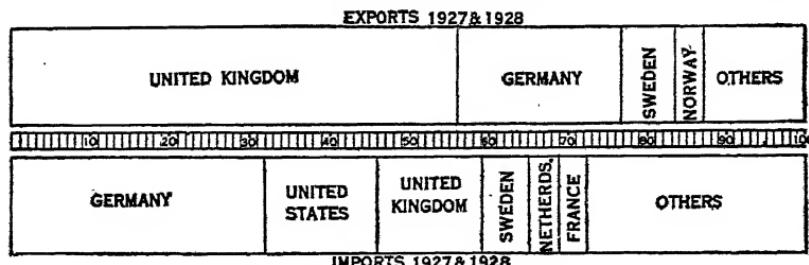


FIG. 166.—Direction of the trade of Denmark.

cent.—in all the dairying industry represents three-quarters of the total export, and well over half goes to Great Britain. The imports are very varied in character, but it is noteworthy that cereals occupy but a small place, showing that Denmark is self-supporting in food-stuffs. The bulk of the imports come from the United Kingdom, Germany, Sweden, and the United States.

The Faeroe Islands (“Sheep Islands”) belong to Denmark, as well as the great plateau of Greenland; Iceland is an independent kingdom, but shares its king with Denmark.

THE NETHERLANDS, OR HOLLAND

Holland, or the Kingdom of the Netherlands (*Koninkrijk der Nederlanden*), is a small country, only 12,603 square miles in area, but with a population (1931) of 8,061,000 or over 625 to the square mile.

Much of Holland consists of the combined delta of the Rhine and Meuse, together with a stretch of low coastland to the north and an area of slightly higher land on the east.



FIG. 167.—The reclamation of the Zuider Zee.

Dotted areas are the tracts to be reclaimed.
Existing land below sea-level shown in black;
 α =area already reclaimed (1931).

The whole country may be described as flat, and it is only in the extreme south-east, where Holland abuts on the Ardennes massif, that there is a small tract of land over 1,000 feet. Holland may be divided roughly into two halves, a western and an eastern. In the western half the soils are alluvial, and there is a fringe of sand dunes along the North Sea coast. Much of this part of the country is actually below sea-level and has been regained from the sea by centuries of labour. In

addition there are large areas which, though above sea-level, lie so low that they cannot be drained by ordinary means. Hence "polders"—enclosures surrounded by dykes or embankments and provided with pumping machinery—are characteristic of much of this part of the country. The soil is rich and moist, well suited to the growth of the finest pasture grasses on which cattle and horses thrive. Agriculture flourishes, wheat being the important cereal crop, and the western part of Holland may be described as a densely populated, thriving, agricultural, dairying country. After many years of discussion, the greater part of the Zuider Zee is now being drained, and has already been made into a lake (Yssel lake) by a dyke.

The eastern half, on the other hand, has a sandy soil of fluvio-glacial origin—the so-called "diluvial" soil—which, in its unimproved state, is much less fertile. Large areas are covered with heathland interrupted by peat-bogs, but on the extensive reclaimed areas large numbers of dairy cattle are reared; the principal food crop is rye in place of the wheat of the fertile west. In the south, on the borders of Belgium, lies the Campine or Limburg coalfield, a comparatively new discovery and an important addition to the

resources of Holland. In 1912 the production was only 1,700,000 metric tons ; in 1931 it had increased to 12,900,000 tons.

Twenty per cent. of the people of Holland are engaged in agriculture. Rye, oats, wheat, barley, and potatoes are grown for home use ; another important crop is sugar-beet. An interesting industry is flower-farming ; large quantities of flower bulbs, such as tulips and narcissi, are grown and exported. Very important indeed is dairy-farming. The cattle, fed on the rich pastures of the polders, produce large quantities of excellent milk, from which butter and cheese are made. Holland has over 2 million cattle and 2 million pigs. Fishing is important, especially among the islands of the north, and Holland shares in the great herring fisheries of the North Sea. Large quantities of oysters are also produced.

In the Middle Ages Holland had a high reputation as a manufacturing country. In the last century the absence of coal was a great hindrance to the development of manufacturing industries, and large quantities of coal were imported from Germany and Great Britain. During recent years industrial development has been considerable, and at the present time no less than 40 per cent. of the people of Holland are engaged in manufacturing industries of one kind or another.

The cotton industry is mainly carried on in the province of Overijssel, at Enschede, Almelo, Hengelo, etc. The large market for cotton goods in the Dutch East Indies has been a great advantage to this industry. Linen and other manufactures are carried on at *Tilburg* and *Utrecht*. *Delft* has long been famous for manufactures of earthenware. The Rhine, the greatest river of Germany, reaches the sea through Holland, and so it is not surprising that although Holland has little coal and less iron, ship-building and ship-repairing are important occupations at the mouths of the Rhine and Meuse (or Maas). *Amsterdam* is the centre of the diamond-cutting industry. The two largest towns in Holland, Amsterdam and Rotterdam, are both ports. *Groningen* is the centre of the north-east of the country, and of a great butter-producing area. The making of straw-cardboard is an important industry near here. The capital of Holland is Amsterdam, but the Royal Residence is at *The Hague* (*s'-Gravenhage*). University towns are Leiden (founded 1575), Utrecht (1636), Groningen (1614), and Amsterdam (1632). The country has long been famous for its art and learning. An industry widely distributed through Holland is the brewing of beer and the distilling of spirit (especially Hollands Gin, which is distilled from rye at Rotterdam and other centres). An important inland centre of trade is *Arnhem*, where artificial silk is made. *Haarlem* is the centre for the bulb-farming industry.

In foreign commerce Holland has stood in the front rank of nations from the very beginning of its separate existence. Among the facilities for foreign commerce the waterways, natural and

artificial, have greater importance in Holland than in any other European country. The length of navigable rivers and canals is roughly double that of railways; canals are more important than

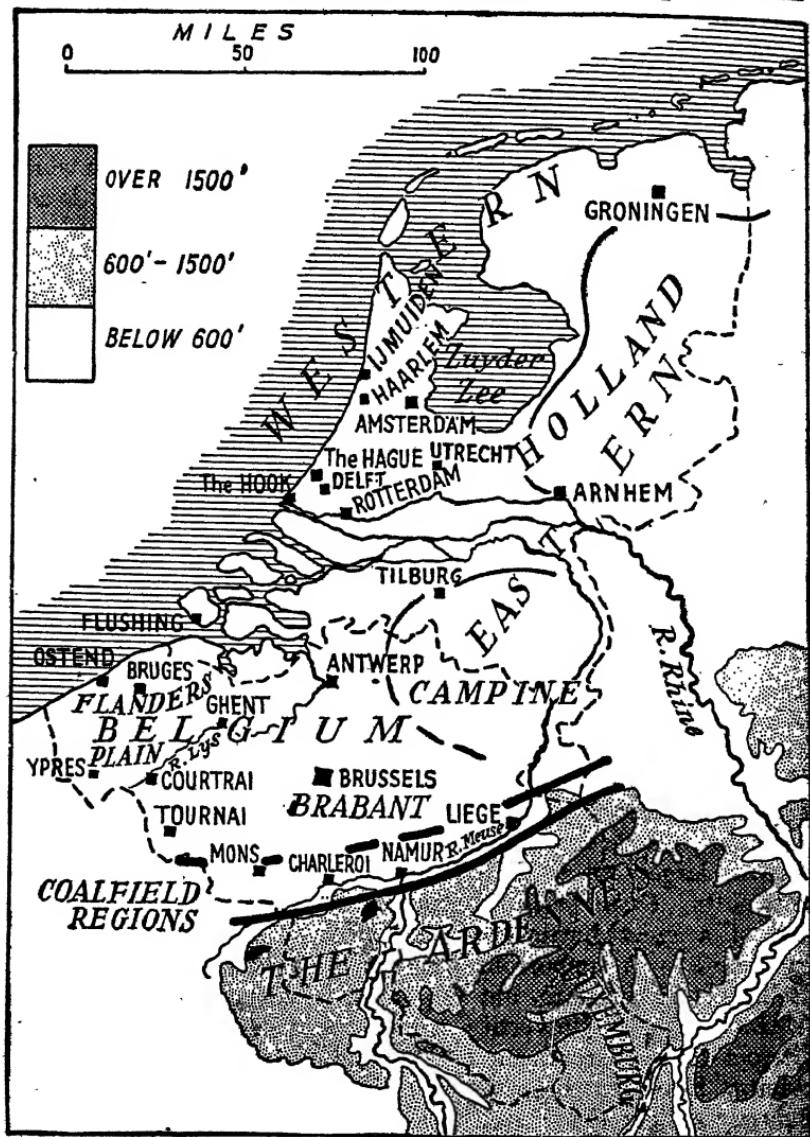


FIG. 168.—Belgium and Holland.

roads. The Dutch are bold and intrepid sailors, as their early voyages of discovery proved long ago. Although a small mother country, Holland has the eighth largest merchant fleet in the world—over $2\frac{1}{2}$ million tons—largely necessitated by the large and widely flung empire of over 790,000 square miles with 60,000,000 people.

During the last few years the imports into Holland have been valued at about £170,000,000 and the exports at £110,000,000. In addition there is a very large transit trade, for Holland forms the natural gateway to the whole of the Rhine Valley and the most important tracts of Germany.

The leading imports are textiles, cereals and flour, iron and steel, coal, wood, and oil seeds, followed by other raw materials of various kinds. Apart from the transit trade, a considerable proportion of the imports are not intended for home consumption, but it is impossible to separate them in the statistics available.

The exports in order of value are textiles, sugar, cheese, butter, meat, vegetable oils, margarine, and paper.

The greater part of the trade is with the nearby countries of Great Britain, Belgium, France, and Germany, but there is a large trade also with the Dutch East Indies and the United States.

The leading seaports of Holland are Amsterdam and Rotterdam, and immense sums of money have been spent to make them suitable for modern traffic. *Amsterdam* is connected with the North Sea, near the harbour of IJmuiden, by a deep ship canal (the North Sea Canal). *Rotterdam*, although well situated on the combined mouth of the Rhine and Maas (Meuse), is liable to be obstructed by the sediment brought down by these rivers. A great canal, the New Waterway, now connects Rotterdam directly with the North Sea, and ocean-going vessels reach the town at all states of the tide. The port, too, has greatly benefited by recent improvements in the navigation of the Rhine, since it is the natural key to the Rhine Valley.

The minor ports of Holland are the Hook of Holland and Flushing (both for passenger and mail traffic with England), Schiedam, Harlingen, Dordrecht, and Groningen.

BELGIUM

The kingdom of Belgium has an area of 11,750 square miles and is thus smaller than either Holland or Denmark. The population numbers nearly 8,100,000 with an average density of about 688 (1930).

The country is divisible into three distinct portions :

(a) In the south the Ardennes form a plateau of hard rocks, partly covered with valuable pine forests and partly with sheep pastures. It is thinly peopled ; but in the south, where the hills are lower, is part of the rich iron field of Luxembourg.

(b) On the north is a country of low hills, devoted to agriculture. Near the coast the land is flat. Important crops are rye, oats, wheat, potatoes, and sugar-beet, from which sugar is made, and in the low-lying tracts, flax. Many cattle are also kept as well as pigs—over a million in each case. In the east is the dry, sandy country of the Campine, covered mainly with useless heathland, but

assuming now a new importance because of the underlying coal-field.

(c) Between the agricultural country of the north and the Ardennes in the south there is a long, narrow strip running right across the country from west to east, and occupied by a coalfield. This is the great manufacturing region of Belgium. Iron ores are brought from the south (Luxembourg), and there are many iron and steel works ; zinc ore is obtained in the east, and is smelted near Liége. The chief coal towns are *Mons*, *Charleroi*, *Namur*, and *Liége*. The production of coal in 1931 was 27,000,000 tons ; the normal production of iron is between 3 and 4 million tons and of steel the same. There are glass works and chemical factories at Charleroi, and chemical and railway works at Liége. The woollen industry is centred at Verviers. This region is very thickly populated.

Belgium is, in the main, an industrial country, and exports iron and steel bars, glass and glassware, cotton goods, flax and yarn, sugar, and zinc, as well as billets of wood from the Ardennes. Another important export is cut diamonds ; the raw material from the Belgian Congo and Angola being cut at Antwerp.

The leading imports are food (grain, etc.) and raw materials (wool, cotton, hides, oil seeds, etc.). Belgium's trade is mainly with her neighbours (Great Britain, France, Netherlands, and Germany), and with the United States. There is a large import of grain, etc., from Argentina.

The capital and largest city is *Brussels*, situated in a central position and well served by railways. *Antwerp* is the largest port, but can only be reached from the sea through Dutch waters. Like Amsterdam and Rotterdam, Antwerp has a large transit trade in goods passing into Germany and a great rivalry exists between the Dutch and Belgian ports.

Antwerp is connected by first-class waterways with the Seine, Mèuse, and more indirectly with the Rhine. One of Belgium's ambitions is to see completed a first-class canal direct to the Ruhr district of Germany.

Courtrai, *Tournai*, and *Ghent* are centres of the flax industry. Tournai has risen to importance because the waters of the River Lys are especially suitable for "retting" the flax. In modern times cottons have to some extent replaced linens, and Belgium has a high reputation for the quality of her cotton manufactures. The coast of Belgium is continually being added to by the sea. Sand dunes are thrown up by the sea, and the marshland behind can be drained. Ypres, Bruges, and Ghent used to be ports, now they are far inland, though Ghent has a ship canal. It follows that the existing ports, of which the largest is *Ostend*, suffer much from being steadily silted up. Many Belgian towns were destroyed during the Great War, but, by the energy of the people, the country has quickly recovered.

Belgium is well served by railways, and there are important waterways, including the River Meuse and the Sambre.

Luxembourg is a tiny state south of Belgium ruled by a Grand Duchess. It has valuable iron ores, which it sends to Belgium for smelting. Luxembourg is united with Belgium for customs purposes in an "economic union."

SWITZERLAND

The little republic of Switzerland, situated right in the mountainous heart of Europe, has an area of 16,000 square miles and a population of over 4 millions. Although five-sevenths of the country is mountainous and a half occupied by uninhabitable high mountains, the average density of 255 is more than double that of Ireland. From a commercial point of view Switzerland is in some respects very remarkable. With little coal and little iron, it is yet pre-eminently a manufacturing country : manufactured goods form the bulk of its exports, raw materials and food the bulk of its imports.

Switzerland is divisible into three :

- (a) The southern half forms part of the main chain of the Alps and is very mountainous.
- (b) In the north is a small strip of the Jura Mountains.
- (c) Between the two lies the Swiss Plateau.

Most of the cultivated land is found in the Swiss Plateau, and there most of the people live. The country is not naturally very fertile, but the Swiss are industrious, and have used every inch which can be used. The crops are the same as in neighbouring parts of France and Germany, but the moistness of the climate, due to the mountainous character of the country, causes Switzerland to be better adapted to pasture grasses than to the growing of food crops. Excluding waste land and forests, 70 per cent. of the land is devoted to cattle-rearing, 30 per cent. to agriculture. The most important occupation is thus dairy-farming, and Switzerland is famous for its cheese and condensed milk. In summer the cattle live on the grass on the mountain sides ; in the cold weather, when the mountains are snow-covered, they are brought down to the valleys. The word "alp" means a mountain pasture. In the absence of coal, Switzerland has developed its water-power to the extent of over 1½ million horse-power. Most of the railways have been electrified, and many of the factories are operated by electricity. Transport is expensive, and so Switzerland has specialized in the manufacture of objects requiring but small quantities of raw material but necessitating cheap skilled labour. Watches and clocks, for example, are made at *Neuchâtel* and *Geneva* and in the small towns of the Jura Mountains. Similarly, fine silk goods are made at *Zurich*, *Basle*, and *Bern*; fine cotton goods at *Zurich*;

embroidery at St. Gall. Milk is tinned at Vevey and many other

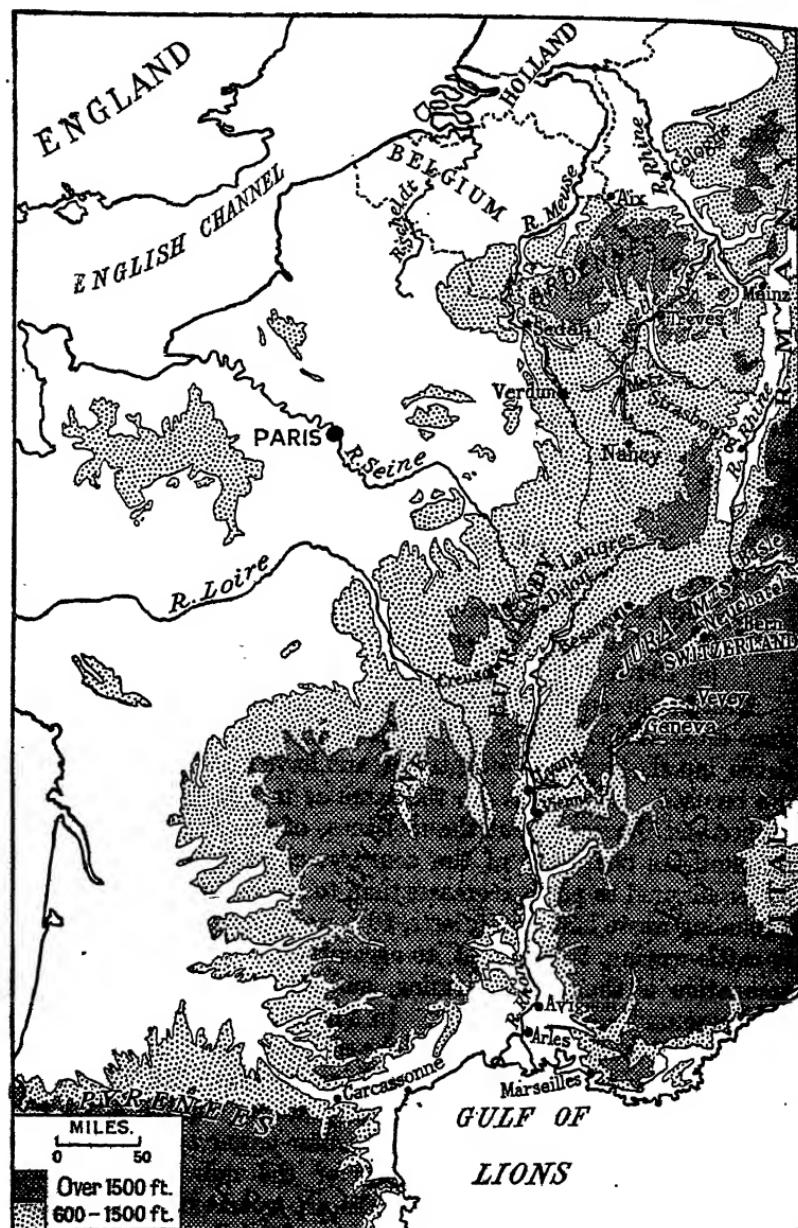


FIG. 169.—Map showing the main outlets of Switzerland *via* the Rhine valley to the north and *via* the Rhone valley to the south (the whole forming the Lotharingian corridor).

places. The making of all kinds of chocolate is a related industry. Other industries include the manufacture of hosiery, linens, boots and

shoes. The reason for the development of the industry in electrical machinery is obvious. There is also now a large chemical industry.

The mountains of the Alpine Zone are very beautiful, and every year huge numbers of tourists visit Switzerland from all parts of Europe. They go in winter for winter sports, and in summer for mountain-climbing. The tourists bring considerable wealth to the country and support the large numbers of hotels. Many of the valleys which face south are warm, and rendered warmer by the Föhn winds. The Föhn winds blow down from the mountains, the air being compressed and warmed by its rapid descent.

Switzerland imports raw materials (cotton, silk, and wool) as well as metals (especially iron and steel) and foodstuffs (wheat, sugar, and vegetables). The import of coal is considerable, also of coarser cotton manufactures. The exports are manufactured goods (fine cotton and silk goods, watches and clocks, and machinery), as well as cheese and tinned milk. The ports utilized by Switzerland are *Antwerp, Rotterdam, Havre, Marseilles, and Genoa*. The trade is principally with Germany, France, the United Kingdom, United States, and Italy.

Switzerland lies at the meeting-point of many routes. *Geneva* has been made the headquarters of the League of Nations. Two important railway tunnels pass through the Alps from Switzerland—the Simplon and St. Gotthard. Two other important railway routes through the Alps are outside Switzerland—one to the west connects France and Italy (*Mont Cenis Tunnel*), the other to the east connects Austria and Italy (*Brenner Pass*).

HUNGARY

Before the Great War of 1914–18 the great central European Empire of Austria-Hungary was virtually ruled by the Austrians, a German-speaking people, from the great capital Vienna (*Wien*). The development of nationalism resulted in the disruption of the empire and the establishment of the new states of Austria, Hungary, Czechoslovakia, and Yugoslavia. Austria was a republic from 1918 to 1938 when it was absorbed into the German Reich by Germany's dictator Herr Hitler.

In many respects Hungary is exactly the opposite of Austria. It is a little larger and has a few more people, but whereas Austria is almost entirely mountainous, Hungary is almost entirely a plain. The Plain of Hungary, running through the centre of which is the Danube, is shut in on all sides by mountains. As a result of the wall of mountains Hungary is cut off from the moderating influence of the sea and has a continental climate of great extremes. The people of Hungary, the Magyars, are essentially agriculturalists.

The Hungarians or Magyars are racially and linguistically very distinct from their neighbours, and Hungary was an independent kingdom as early as 1001. The race-home of the Magyars is the plain, but the plain fades into hill country on all sides, and the boundaries of the present Hungary are purely artificial. Particu-



FIG. 170.—New countries carved out of the old Empire of Austria-Hungary.
The shaded area shows the extent of the old Empire.

larly on the north it is noticeable that Hungarian villages are found in the valleys, Slovak villages on the spurs of the hills. In the partition of central Europe after the Great War there was a tendency for such country, inhabited by mixed races, to go to the neighbours, leaving an unwarrantably small Hungary occupying the heart of the

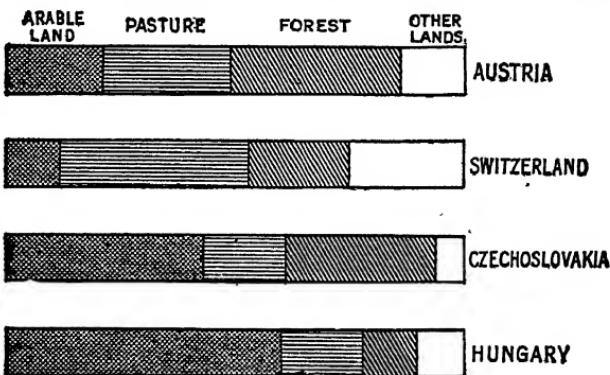


FIG. 171.—Diagram showing uses of land in Central Europe.

Plain only. Of the 8,684,000 people (1930), 90 per cent. are Hungarians and only 1·7 per cent. Slovaks, whereas in Czechoslovakia there are no less than 750,000 Hungarians, and in Yugoslavia 470,000 Hungarians. This population distribution is obviously a source of danger to the peace of central Europe.

The natural vegetation of the plain is steppeland and there are

few trees. But the natural grass land has almost disappeared. Some of the soil is poor, especially in the north, and rye, oats, barley, and potatoes are the principal crops. But on the richer land

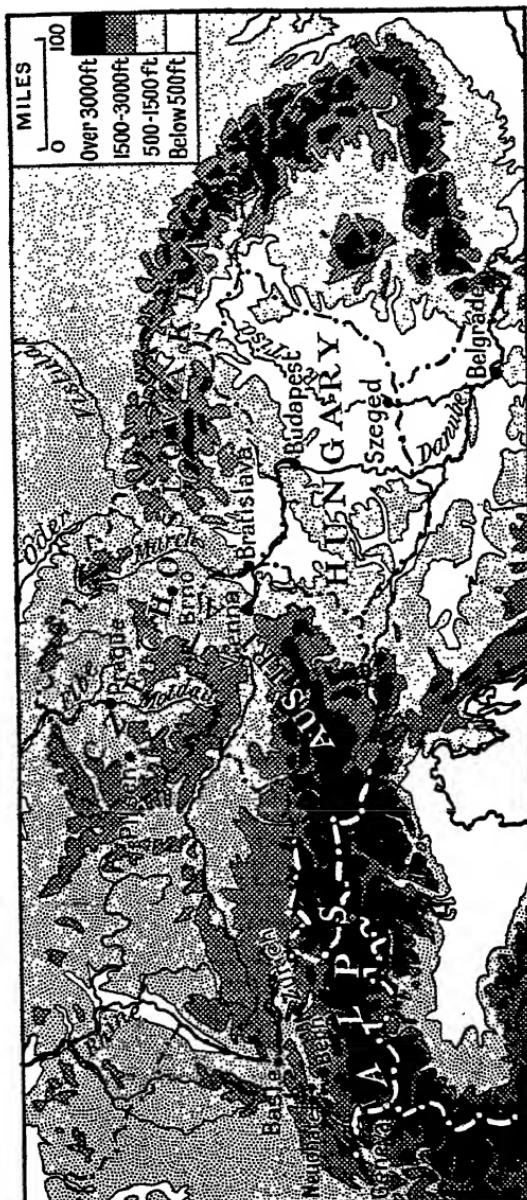


FIG. 172.—Map showing the countries of the mountainous belt of Central Europe.

farther south wheat and maize are the main crops, and the yield of good quality wheat is high. Sugar-beet, hemp, and flax are also grown. Many cattle are kept and fed upon fodder crops or corn, specially grown, and there are large numbers of sheep and pigs.

The north shore of Lake Balaton is an important wine-producing area, but the best-known wines come from the hilly country "Tokay" in the north-east. Lake Balaton, the largest lake in central Europe, has large numbers of fish, and so have the Danube and Theiss. Most of the industries of Hungary were connected with agriculture—flour-milling, sugar-making, and distilling—but in the last few years there has been a marked increase in manufactures, notably of electrical machinery and apparatus, especially in Budapest. Hungary has deposits of good coal in the south-west near Pecs, and also deposits of lignite and extensive areas of bauxite, but has little or no iron or other minerals. There is, however, an iron and steel industry.

Budapest (1,060,000) the principal town, really consists of two towns, one on either side of the River Danube. It is situated just where the Danube passes through the only hill range in Hungary, and where the river can be bridged. Budapest is an important railway junction, and the natural collecting centre of the plain. The Danube and its tributaries are also used for transport, the

EXPORTS 1934-35

FOOD AND DRINK ETC.		LIVE ANIMALS		MANUFACTURES						
WHEAT	FLOUR	RYE	LARD	SKINS	FEATHERS	OTHERS	RAW MATERIALS	ELECTRICAL MACHINERY	OTHERS	
10	20	30	30	40	50	60	70	80	90	100
<hr/>										
FOOD & DRINK	COTTON	COAL	TIMBER	OIL	PAPER	TEXTILES ETC.	OTHERS			
	RAW MATERIALS		PARTLY WORKED MATERIALS AND MANUFACTURES							

IMPORTS 1934-35

FIG. 173.—The trade of Hungary.

Danube being an international river controlled by a Commission. Szeged, on the River Theiss (Tisa), is the largest town in the south of Hungary; Debrecen, to the east, is slightly smaller.

Wheat and wheat-flour make up now only an eighth of the exports of Hungary; cotton and woollen goods are now less important than raw cotton in the imports. A quarter of all the exports go to Austria, a quarter to Germany, a tenth to Czechoslovakia, thus illustrating the complementary nature of the products of Hungary and those of her neighbours.

CZECHOSLOVAKIA

Another country which has arisen in Europe as a result of the Great War is Czechoslovakia. Before 1918 it was part of the Empire of Austria-Hungary. It is a mountainous country in the heart of Europe with an area of 54,000 square miles—rather larger than England—and a population of 14,500,000. The country consists of three parts:

- (a) The Czech Plateau, surrounded by mountains and sloping gently towards the north-west, i.e. towards Germany.

The plateau is drained by the River Elbe and its tributaries the Moldau and Eger. The Elbe flows through a gap in the north and then through Germany.

(b) The valley of Moravia in the centre cuts the country in half. In the south the river March flows southwards and joins the Danube. In the north the River Oder cuts through the mountains by the Moravian gap and passes through Silesia and Germany.

(c) The mountainous mass of Slovakia in the east consists of the southern slopes of the Carpathians and the numerous mountain valleys, with fragments of the Hungarian Plain.

These three distinct units are united by a strong national feeling, but amongst the difficulties in governing may be mentioned the considerable Magyar population in the valleys of southern Slovakia as well as the large German population of Bohemia. Czechoslovakia.

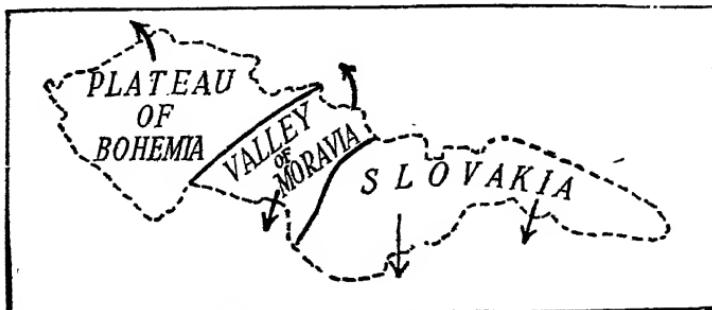


FIG. 174.—The natural regions of Czechoslovakia. The arrows show the natural outlets of each region. The Czech Plateau was formerly called the Plateau of Bohemia.

notwithstanding these difficulties, has become one of the most stable of the new countries of Europe.

The Czech Plateau has numerous rich coalfields, both of hard coal and lignite. Various minerals occur in the surrounding mountains. The broad valley-plains of the rivers which drain the plateau—the Moldau and the Elbe—have very rich alluvial soils and produce crops of very high quality. Potatoes, rye, and wheat form the staple food of the people, but hops are grown for brewing (Pilsener beer at Pilsen) and sugar-beet for making sugar. Cotton-mills, glass and chemical factories have sprung up on the coal-fields, whilst paper-mills and saw-mills are found near the forested mountains where water-power is available. Iron ore is found between *Praha* and *Pilsen*, and both these places have iron and steel works, whilst *Praha* (Prague or Prag), the capital, has manufactures of many kinds. In the higher and poorer parts of the plateau rye, oats, and barley take the place of wheat.

The Moravian Lowlands have also good agricultural lands where barley and sugar-beet are grown and, in the south, maize

and fruits. But the lowlands have rich coalfields—in the north is part of the Silesian coalfield, and there are other coal and lignite fields farther south. The coalfields have attracted manufactures—woollen goods and machinery are both made at Brno. The

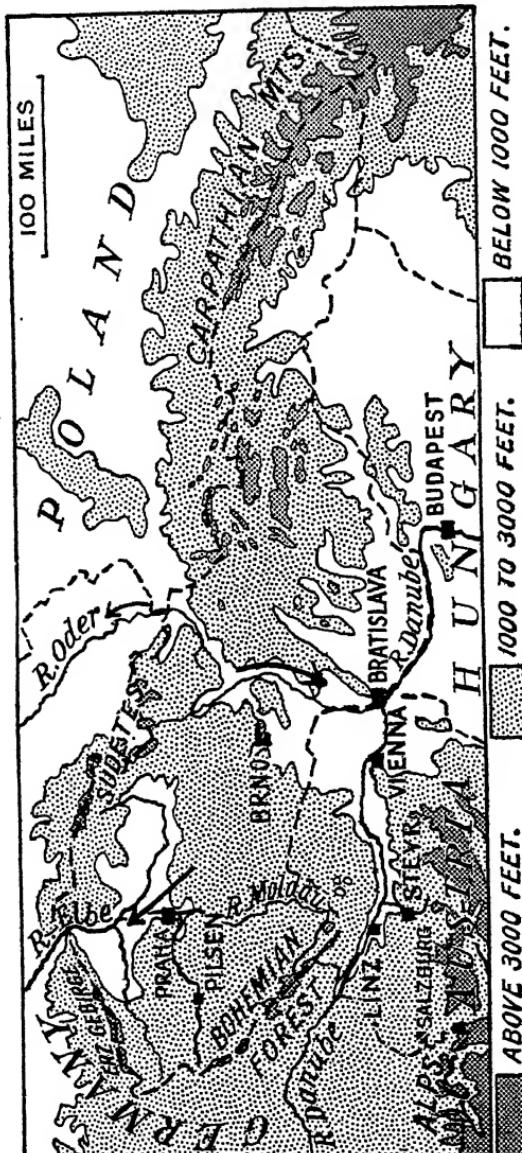


FIG. 175.—Map of Czechoslovakia.

Moravian Lowlands have two outlets—one to the south through the river port of Bratislava on the Danube; one to the north through the Moravian gate.

The Carpathians are largely covered with valuable forests,

and many places are rich in minerals. They require development. In the mountain valleys barley, sugar-beet, and potatoes are grown, whilst numerous cattle and sheep flourish on the mountain pastures.

Communications and Trade.—Czechoslovakia is in an unfortunate position regarding communications. Until recently there was no railway from one end of the country to another. The natural outlet of Bohemia is down the River Elbe through Germany to Hamburg. The outlet of Moravia is down the Oder to Stettin, or through Bratislava on the Danube. The railways from Bohemia and Moravia centre on Vienna in Austria, and those from Slovakia

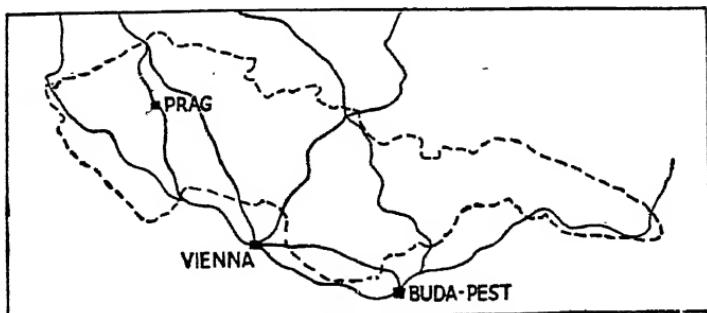


FIG. 176.—The railways of Czechoslovakia in 1919.
Notice the absence of a main railway running from east to west.



FIG. 176A.—The main railways of Czechoslovakia in 1935.

centre on the Hungarian capital of Budapest. Thus the trade of Czechoslovakia passes through many different countries and in many directions. Raw cotton and raw wool represent a fifth of the country's imports (1934); cereals and animal foodstuffs a tenth. First place amongst exports is taken by cotton manufactures (10 to 15 per cent.); woollen goods, cotton yarn, iron and iron manufactures, sugar, and glass-ware are also exported. Timber, coal, and lignite figure among the raw material exported.

The total value of the imports is over £43,000,000, and of exports rather more.

YUGOSLAVIA

Yugoslavia is another of the states which grew up after the Great War from the break-up of Austria-Hungary. The area is about 96,000 square miles, and the population 14,000,000—a density of 145 per square mile. It consists of :

- (a) The old kingdoms of Serbia and Montenegro ;
- (b) Those southern parts of the old Empire which were inhabited mainly by Slavs—Bosnia, Herzegovina, Dalmatia, Croatia, and Slovenia.

Indeed the various parts of Yugoslavia differ greatly from one another in their natural features, their history and development, and in the character of their inhabitants. Only racial affinity—Yugoslavia is the kingdom of the southern Slavs surrounded entirely by alien races—and language unite the nation. The King of Serbia became the King of the enlarged country, and he has endeavoured to unify the whole by setting up nine provinces, or *banovinas*, which ignore the old units and thus to try and make his people forget the old differences between Serbs, Bosnians, Croats, or Slovenes. The old divisions are, however, roughly the natural regions into which the geographer would divide the country. These divisions are :

(a) *The Alps of the North* and the valleys which open out into the lowlands. This region, Slovenia, is very like the neighbouring parts of Austria, with its beautiful scenery, winter sports, and the fine lake resort of Bled ; it shares in the tourist industry of Austria and Switzerland. The chief town is Ljubljana.

(b) *The Adriatic Coast and Dinaric Alps*.—This region corresponds to the old province of Dalmatia and consists of limestone ranges running parallel to the coast, which is fringed with numerous islands. The climate is Mediterranean, but over large areas the hills are dry and barren and the name of “karst” or “karstlands” is given to such limestone country where great underground channels have been formed by the action of water and where much of the drainage is below ground, leaving the surface dry. Crops, including the vine, can only be grown in certain places along the coast and in the more favoured valleys. The coast abounds in sheltered harbours, easily reached from the sea but cut off from the interior by the high ranges of mountains. Consequently the coast lands have been strongly influenced by Italy, from the head of the Adriatic Sea, and the coastal towns are very Italian in

appearance. In the north the Yugoslavs have built their own port of Susak, adjoining the Italian port of Fiume. Further south are Split (formerly Spalato) and Dubrovnik (Ragusa) linked by road and rail through difficult mountain passes with the interior. Near the southern border of the country, Kotor (formerly Cattaro), in a wonderful bay, serves as the port for Cetinje, the capital of the former independent country of Montenegro, which is reached by a marvellous mountain road.

(c) *Bosnia and Herzegovina* lie amongst the mountains behind the Dalmatian coast. This is wild, inaccessible country in which the people live in the valleys amongst the forested hills. Minerals are found in some areas; the chief town is *Sarajevo*, near the northern fringe. In this region many of the people are Mahomedans.

(d) *Croatia and the Northern Plain*.—Traced eastwards and north-eastwards the mountains of Slovenia and the hills of Bosnia pass gradually into a country of lower hills with broader valleys and this in turn fades into the great Hungarian Plain, drained by the Danube and its great tributaries, the Sava and Drava. In the north is *Zagreb*, around which the agricultural land is in basins, but out on the plain (centre *Subotica*) is an almost unbroken stretch of wheat and maize with sugar-beet and tobacco.

(e) *Serbia or the Southern Region*.—This is again a hilly and mountainous tract, bounded on the north by the Danube. The land slopes, on the whole, northwards towards the Danube.

The hills are sometimes forested, at other times clothed with mountain pastures suitable for cattle and sheep. There are deposits of iron, lead, and other minerals in places. But the most important parts of the region are the sheltered valleys, where wheat, maize, and fruits flourish. Large quantities of plums are grown and dried for export as "prunes." They are also used in making a kind of brandy, the national drink of the Serbians. Other crops include the vine, sugar-beet, hemp, and tobacco. The capital, *Belgrade*, lies near the junction of the Save with the Danube and between the northern plain and the southern region. *Nish* commands the route to Salonika and Istanbul.

Communications and Foreign Trade.—Although Yugoslavia is unfortunate in the difficulty of reaching its own Adriatic coastline, Susak has now become a considerable port and in the south the country has special facilities at the Greek port of Salonika. Yugoslavia is still essentially a primary producer. There is an export of timber from the forested southern hills, the remainder of the exports are mainly agricultural produce—maize, eggs, meat, pigs, cattle, and wheat. The imports are essentially manufactured goods—especially textiles—and some coal and oil.



FIG. 176B.—Map of Yugoslavia showing the old political divisions which coincide closely with the natural regions.



FIG. 176C.—Map of Yugoslavia showing the new political divisions which have been created with the idea of unifying the country. Notice that they cut across the boundaries of natural regions and attempt to unite fragments of areas of very different types. Chief towns of the provinces or *banovinas* all named.

RUMANIA

Rumania is a kingdom which has nearly doubled in size since the Great War, and now includes a large part of the former Empire of Austria-Hungary. It is now considerably larger than the British Isles, and has a population of 18,025,000. Forming a great curve of mountains throughout the centre of the country, and dividing it into two distinct halves, are the Carpathian Mountains and the Transylvanian Alps. Rumania is thus divisible into :

(a) The Wallachian Plain—the valley of the Lower Danube—and the Bessarabian-Moldavian Plateau, which lie to the south-east of the mountains.

(b) The mountains which form a broad barrier through the country.

(c) Transylvania and the Banat, on the west of the mountains, which consist of a mass of hills and sheltered valleys.

The Wallachian Plain has a continental climate with hot summers, cold winters, and a low rainfall, falling mainly in early summer. It is part of the steppelands, and is now one of the great wheat lands of the world. Huge quantities of wheat, barley, and maize are grown, the maize mainly in Bessarabia with oats on the poorer lands farther north. Bucharest, the capital, lies in this region, Galatz and Braila are river ports on the Danube. Dobruja, the region south-east of the Danube, differs from the Wallachian Plain. Half of it is marshy and useless, the remainder is mainly pastoral country, producing large quantities of wool. The port of the region is Constanta on the Black Sea, which is free from ice all the year. Many of the towns of the Wallachian Plain have developed industries connected with agriculture—flour-milling, brewing, distilling, and sugar-making.

The Mountains are forested up to 5,000 feet, especially on the Transylvanian Alps. On the lower slopes are beech trees, on the higher parts soft-wooded coniferous trees grow. The logs are floated down the rivers to saw-mills at Galatz. Above the forests are summer pastures with large numbers of sheep.

In the foothills of the mountains, especially near Ploesti, are rich oil-fields. In the production of oil Rumania ranked fourth among the countries of the world in 1933. The oil is refined at Ploesti and sent by pipe-line to Constanta.

Transylvania and the Banat have valuable mineral deposits—gold, silver, copper, lead, iron, and coal—as yet little developed. Many of the hills are wooded, forests covering 40 per cent. of the

surface; large numbers of sheep are kept on the hill pastures, while cultivation is carried on in the valleys. Maize is the principal crop.

Rumania is essentially an agricultural country. Its principal exports are maize, barley, wheat, wheat-flour, timber, petroleum, and livestock; its imports are cotton and woollen goods, iron, steel, and machinery.

Before leaving Rumania, the difficulty of communication between one part of the country and another should be noted. The Danube is an international river; but, unfortunately, its lower course is frozen in winter. Notice where the Danube passes through the great gorge known as the Iron Gate, now made navigable, and thus cuts through the mountain barrier which separates the Hungarian Plain from Wallachia.

FRANCE¹

Position and Size.—With the exception of the Soviet Union, the republic of France is now the largest country in Europe,

a position occupied in 1914 by Austria-Hungary. The area is nearly 213,000 square miles, and the population (1931) nearly 42,000,000. The advantageous position of France is especially worthy of note. She has not only a long coast-line along the Channel and the Atlantic, facing the North American continent, and thus sharing the advantages enjoyed by Great Britain for trans-Atlantic trade, but she has also an important length of coast-line along the Mediterranean well situated for far

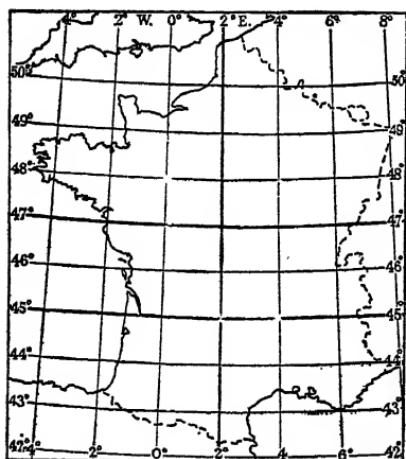


FIG. 177.—The position of France.

Eastern trade. It may be argued that Spain also has these advantages, but whereas Spain is cut off from the rest of Europe by a great mountain barrier, France adjoins on her eastern frontier some of the most populous and prosperous countries of Europe—Belgium, Germany, Switzerland, and Italy.

Physical Features.—The west, north-west, and north of France—more than half the whole country—belong to the great

¹ Before studying this section on France, the position of the country relative especially to the structural and climatic regions of the continent should be revised from pages 2 to 28.

European plain, and in many ways are comparable with the south-west, south, and south-east of England. The central plateau or "massif central" forms a very well-marked unit—a plateau with a high south-eastern and eastern edge forming the Cevennes. The surface slopes gently westwards and north-westwards, hence the main drainage is in these directions. The south-east of France is occupied by the Alps, which reach the coast in the Maritime Alps to form the beautiful Riviera coast. It is not always realized what a large proportion of the Alps actually lies in French territory. Between the Alps and the Cevennes lies the fertile Rhone Valley; between the Cevennes and the Mediterranean are tracts of lowland which form part of the Mediterranean region. Along the southern borders of France lie the Pyrenees; in the east of the country are

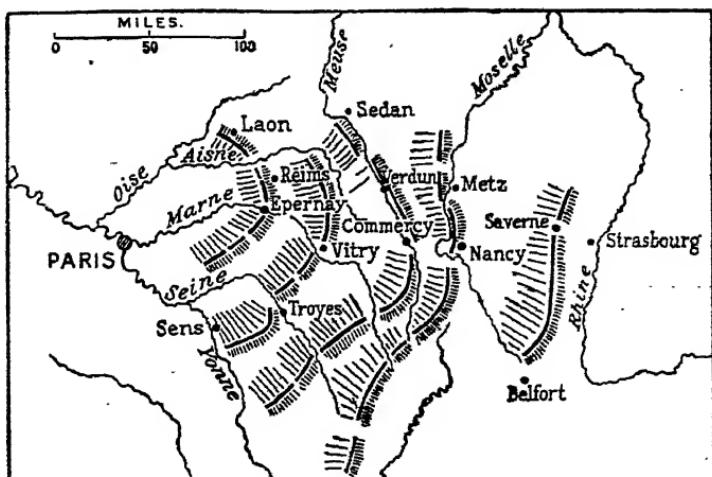


FIG. 178.—The scarps to the east of the Paris Basin (see p. 243).

the Vosges, separating the northern plainland from the rift valley of the Rhine.

The great rivers of France are important as navigable highways. One only drains to the Mediterranean—the Rhone—two to the Bay of Biscay—the Garonne and the Loire—whilst the Seine is the most important river flowing into the English Channel. France is now one of the riverine nations of the Rhine and a considerable tract of north-eastern France drains into its tributary the Meuse.

Geology and Minerals.—The geology of France is reflected to a remarkable degree in the topography. The Central Massif consists of an old stable block of crystalline rocks surrounded by a ring of limestone. Particular economic interest attaches to the small folds of coal-bearing Carboniferous and Permian strata which are pinched in amongst the older rocks and also to the areas of late volcanic rock which cover parts of the surface, especially in the

Puy de Dôme district. The great fold range of the Pyrenees has a core of ancient crystalline rocks. The same is true, of course, of the Alps, but in the Alpine folds so well known in the Maritime Alps of France and the Riviera massive limestones predominate. The lowlands of the west and north of France fall geologically into three distinct parts. In the north-west is the Armorican massif of old rocks—sometimes called the Brittany massif, though it extends beyond the confines of Brittany—broadly comparable with the massifs of Cornubia and North Wales in England. Between the Armorican mass, the Central Plateau and the Pyrenees lies a broad basin of young sedimentary rocks—the Aquitaine Basin. Occupying the whole of the north of France is the Paris Basin, using that term in the widest sense. On the Belgian borders the Ardennes massif extends into France, whilst the great Belgian coal field is continued through France, under a cover of chalk and other rocks, to the shores of the Strait of Dover. Eastern France has the Jurassic iron ores of Lorraine, and includes a portion of the Rhine rift.

Broadly speaking, France is not richly endowed with minerals, but benefited from the restoration of Alsace-Lorraine which gave her the whole of the vast Lorraine iron ores and also the Alsatian potash deposits.

Mineral	Production—millions of metric tons		
	1925	1930	1934
Coal	47.1	53.9	47.6
Lignite	1.0	1.1	1.0
Iron ore	35.8	48.5	32.2
Salt	1.3	1.7	1.8
Alsace potash products	1.2	0.5	0.4
Lead, zinc, silver ores	0.03	—	—
Gold ores	0.06	—	—

Coal.—France possesses but a single large coalfield region—that of the north of the country, which is an extension of the Belgian field. In reality there are several basins, but they occur approximately in a line and may be considered together. The fields suffer from intense folding and much of the coal is powdered, just as it is in the Belgian fields. This area produces three-quarters of the coal of France (1933). The only other fields in France are those already mentioned as lying amongst the old rocks of the Central Plateau. Those of St. Etienne, Creuzot, and Alais are the chief and have given rise to small industrial regions. France had also, until 1935, the Sarre coalfield, but this was restored to Germany as the result of a plebiscite. Its output in

1932 was 10,400,000 metric tons. France has insufficient coal for her requirements and is forced to import large quantities. Although the output is but small, special interest attaches to the mineral oil of Pechelbronn (Alsace), because the oil is obtained by mining the sands in which it occurs.

Iron Ore.—The one mineral of which France has large quantities is iron ore. Apart from small quantities from Normandy and near Creuzot and in the Pyrenees, nearly the whole output is from the great Lorraine field. The ore is low grade, and it was not until processes were perfected whereby the content of phosphoric acid could be eliminated that the deposits could be utilized. Much of the ore is smelted in the Briey Basin near the source of the raw material; but ore is also sent by water to the northern coal fields. France is handicapped in her iron and steel industry by the paucity of coal, and having lost the Sarre field the position is now far worse.

The Alsace Potash deposits occur a little to the north-west of Mulhouse, and are second in importance only to those of Prussian Saxony. The production reached 1,350,000 metric tons, yielding 230,000 tons of potash in 1922 and to a yield of 312,000 tons of potash in 1925.

Water Power.—The small reserves of coal in France have acted as a spur in the development of hydro-electric power. The principal developed and potential regions are the French Alps and the Pyrenees, the Cevennes form a subsidiary region. In 1934 4,000,000 horse-power was actually developed. It has been decided to electrify the whole of the French railway system and a considerable mileage—including the Midi Railway south of Bordeaux and part of the Paris-Orleans line—has already been done.

Climate.—In addition to the advantages already mentioned which accrue to France from her position between the Atlantic and the Mediterranean are those due to the consequent variations in climate and products dependent thereon. In the lowlands of the north and west the climate is of the North-western European type; warmest in the south-west, colder and more continental in the north-east. Owing to the elevation, the climate of the Central Plateau is characterized by colder winters and may be deemed of the Central European type—the same is true of the east of France. The lowlands round the Mediterranean have a typical Mediterranean climate but it is difficult to say how far up the Rhone Valley the type extends. Lyons may be taken roughly as the limit, but the cold winter winds which blow down the funnel-like Rhone Valley and are responsible for the turbulent Gulf of Lyons—actually an unkindlier stretch of water than the famed Bay of Biscay—render the climate not typically Mediterranean.

The natural vegetation of France naturally varies widely with

the climate. Out of a total area of the country of 136,000,000 acres 26·1 million acres are under forest; 11·3 million are moorland and uncultivated. The forests which thus cover 19 per cent. of France are a source of considerable national wealth, and are carefully controlled, and very large areas, especially south of Bordeaux on the "Landes," are actually plantations. Whilst much of the north and west is well wooded with deciduous trees, it is the pine forests of the higher land which are of the greatest importance. Some of the pine woods of the Mediterranean coast are valuable as sources of resin, which is obtained by tapping the trees in much the same way as rubber trees are tapped.

Agriculture.—Out of 89 million acres under crops, fallow and grass in 1928, the arable land accounts for 54·8 millions. The following table shows the principal crops:

Crop	Acreage (millions)		Yield (million metric tons)	
	1925	1934	1925	1934
Wheat	13·9	13·1	9·0	8·4
Rye	2·1	1·7	1·1	0·8
Barley	1·7	1·9	1·0	1·1
Oats	8·6	8·1	4·8	4·1
Potatoes	3·6	3·4	15·2	16·0
Sugar-beet	0·5	0·7	5·4	—
Vines	3·5	3·5	1,500 ¹	1,093 ¹

¹ Millions of gallons.

Wheat.—The importance of the French wheat crop is not always fully appreciated. France grows nearly a quarter of all the wheat produced in Europe outside Russia. Even so, the production is insufficient for home needs. Though wheat is widely grown for local markets throughout France, the Paris Basin is pre-eminently the wheat land of the country. The west tends to be somewhat too damp (compare Devon and Cornwall), the south-west is more suited to maize; the soil of the Central Plateau is too poor.

Rye becomes the staple grain on the poor soils of the Central Plateau and the east.

Oats grow mainly in the north and west; in the Mediterranean belt they almost disappear.

Maize, though not mentioned in the above table, is the great crop of the warm, damp south-west; it is almost absent from the regions of summer drought, whilst the north, like the neighbouring parts of England, is too cold.

Root crops, including potatoes and sugar-beet, are of first importance, especially in the agricultural lands of the Paris Basin.

The Vine, as shown in Fig. 179, is widely cultivated in France

and is not restricted to the Mediterranean belt, which yields the largest production of unnamed *vin ordinaire*. Despite a total production averaging about 1,100,000,000 gallons, of which only between 14 and 15 million gallons (1931-34) are exported, France figures as a large importer of wine—300 to 400 million gallons average (1931-4). The localization of production of the better-known types of wine in France is important—the clarets around Bordeaux; many white wines in the lower Loire Basin; champagne on the dry chalk hills of the Champagne district in the east of the Paris Basin; and burgundies in the Côte d'Or.

Fruits of many kinds are widely grown—apples for cider in the north-west; various deciduous fruits in the Paris Basin. The olive is definitely restricted to the south-east, and, as usual, its distribution is really coincident with the Mediterranean type of climate.

Animals.—There were in France, at the end of 1933, nearly 3 million horses; 15.8 million cattle; 9.7 million sheep; 2.4 million goats; and 6.8 million pigs. Thus France has double the number of horses, cattle, and pigs found in Great Britain, but less than half the number of sheep.

Cattle are especially numerous in the wet north-west (the Armorican Massif) where butter-making is a very important industry; they are also numerous all over the north, in the Rhine country, among the Alpine pastures and on the northern borders of the Central Massif. In all these areas cheese and butter making are carried on, cheese becoming markedly more prominent in the south as butter is in the north. Cattle are very few in the Mediterranean region.

Sheep are most numerous on the Central Massif and on the dry chalk hills around the Paris Basin.

Sericulture is important in France, but is practically restricted to the Rhône Valley south of Lyons and adjoining regions.

Fisheries.—France, like Spain, enjoys the advantage of fisheries in the Atlantic and the Mediterranean. The industry employs 140,000 and the value of the catch approaches £13,000,000 (1934). The two great fishing grounds are off the coasts of the north-west (pilchards, sardines, etc.), and in the Mediterranean (tunny).

Manufactures.—One consequence of the wide dispersal of the French coalfields is the fact that the localization of the great

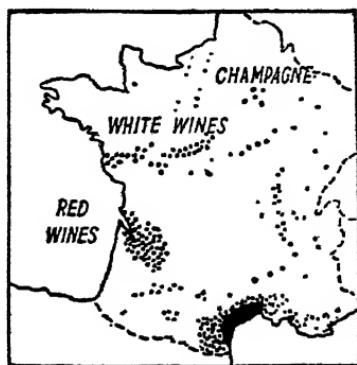


FIG. 179.—The vineyards of France.

Notice that most vineyards are found in the Mediterranean region. The northern coast is too cold for the vine and so is the central plateau.

manufacturing industries is governed more by the position of local supplies of raw material and the conveniences of obtaining supplies from abroad and marketing the product than by the supply of fuel.

The *iron* industry grew up at Creuzot, but great centres are now on the Lorraine iron fields (Briey Basin) and the northern coal field. Of the important *textile* manufactures, silk is concentrated in the Rhone Valley, where it was originally dependent on local supplies of raw material, and is carried on at Lyons, St. Etienne, Avignon, and Nîmes; cottons are very important in Alsace (especially Mulhouse), and in the towns of the Vosges, as well as on the northern coal fields (Lille, Roubaix, etc.), and at Rouen. Woollens are concentrated in the north, where are the principal supplies of native wool and where lie the ports of Havre, Rouen, and Dunkirk, importing Plate wool. Paris, like London, is associated with a wide variety of manufactures, but particularly with luxury goods and clothing. Among other French manufactures may be mentioned porcelain, earthenware (Paris, Limoges), glass (northern coal field), and watches (French Jura).

Communications.—A distinctive feature of the internal communications of France is the extensive use made of waterways. The principal canals and navigable rivers are shown in Fig. 44, on p. 48, and it should be added that a large network of canals exists in the north and north-east, so that most of the large towns, such as Metz, Nancy, Sedan, Arras, Lille, etc., are in direct communication by first-class waterways (at least $6\frac{1}{2}$ feet deep) with the great ports of Dunkirk and Antwerp. The extensive French railway system centres on Paris.

Ports.—France has about half a dozen great ports. Marseilles occupies the leading position, since it has nearly all the Mediterranean and far Eastern trade, and benefited enormously by the opening of the Suez Canal. It has recently been connected with the Rhone by a deep-water canal. Its local industries, such as the refining of oil and the making of soap, dependent originally on the local supply of olive oil, have expanded very largely. Havre and Rouen share much of the American trade of France (importing cotton, wheat, wool, coffee, etc.), and are the ports of Paris, but have a great rival in Dunkirk. The latter has risen rapidly; being conveniently situated for the northern coal field, it imports the raw material required by the manufacturing towns of that area—notably wool—and exports their finished products. Bordeaux is the wine-exporting port; Cherbourg occupies the same position as Southampton does in England, as a port of call for trans-Atlantic liners; La Rochelle and Nantes with their outports conclude the list of large French ports.

Foreign Trade.—More than four-fifths of the exports of France are manufactured goods; more than four-fifths of the

imports are foodstuffs and raw materials. The unique feature of the export trade is the high value of wearing apparel; the large import of coal emphasizes one of the great weaknesses of France's general position.

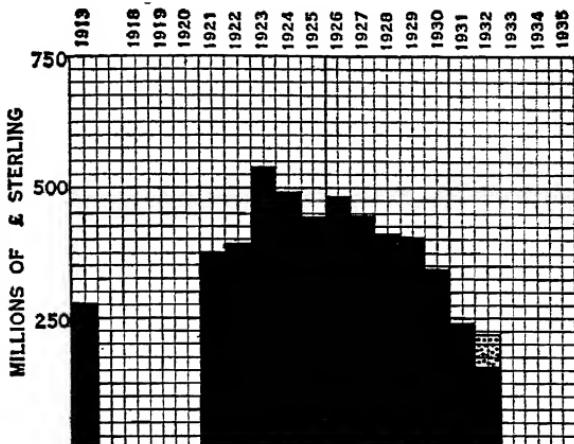


FIG. 180.—The exports of France, converted into sterling at rate of exchange current for each year (stabilised 1927-1931).

Stated in francs, the trade shows a steady rise to 1926:

1913	6.9 billions.	1925	45.4 billions.	1930	42.8 billions.	1935	15.5 billions.
1921	19.8 "	1926	59.7 "	1931	30.1 "	1936	15.1 "
1922	21.4 "	1927	55.2 "	1932	19.7 "		
1923	30.9 "	1928	56.0 "	1933	18.4 "		
1924	41.5 "	1929	52.0 "	1934	17.8 "		

Tonnage shows a steady and continuous rise 1921-1929.

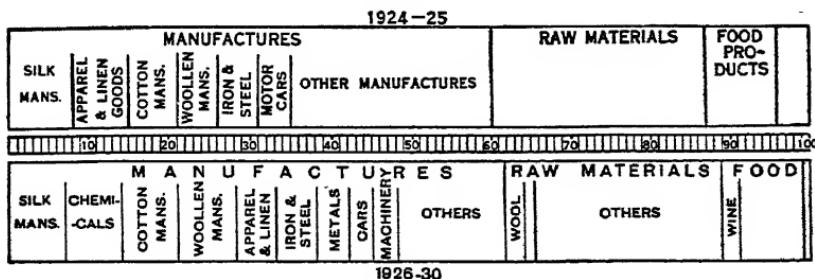


FIG. 181.—The exports of France.

The principal items included under the category of "food" are wine, fruits, and sugar. Raw materials include some iron ores, hides and skins, and wool.

NATURAL REGIONS OF FRANCE

Northern France.—Northern France corresponds broadly with the Paris Basin, used in its widest sense. It does, however, include also (1) a small fragment around the great port of Dunkirk of the maritime plain of Flanders described under Belgium; (2) a fragment of the old massif of the Ardennes, also described under

Belgium; and in the east (3) portions of the massifs bordering the Rhine. Eliminating these border tracts, the Paris Basin may be

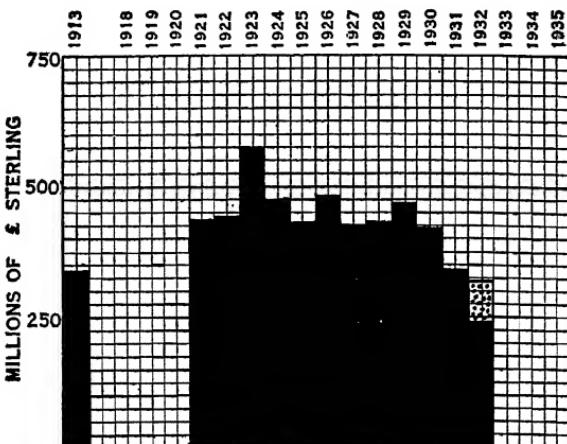


FIG. 182.—The imports of France. Converted at average rate of exchange for each year.

Expressed in Francs :

1913 8.4 billions.	1925 44.0 billions.	1930 52.9 billions.	1935 20.9 billions.
1921 22.8 "	1926 59.6 "	1931 42.2 "	1936 24.4 "
1922 24.3 "	1927 52.9 "	1932 29.8 "	"
1923 32.9 "	1928 53.0 "	1933 28.4 "	"
1924 40.1 "	1929 58.0 "	1934 23.1 "	"

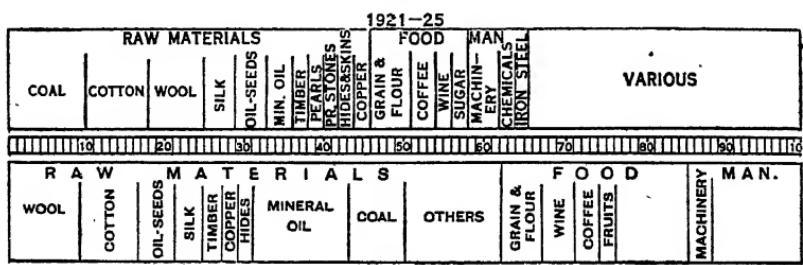


FIG. 183.—The imports of France.

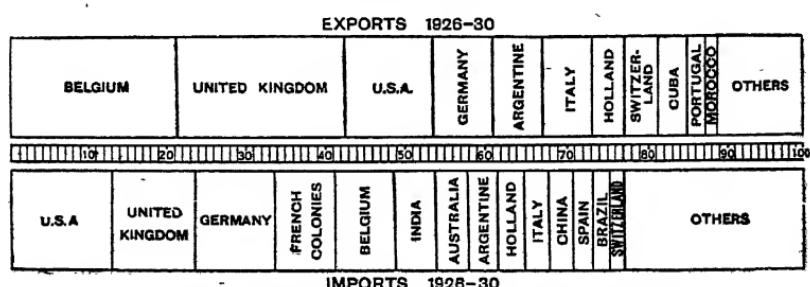


FIG. 184.—The direction of the foreign trade of France.

likened to graduated saucers, one inside the other, the smallest in the centre. In the centre are beds of sands, clays, and marl

in very varied and alternating sequence, of Tertiary age. Some of the sandy tracts are of little use for agriculture and give rise to forested tracts; on the other hand, some of the clayey or marly beds afford ideal agricultural land. A group of limestones—only 90 or 100 feet thick, but very important—form the well-known calcaire grossier of the Paris Basin, and not only afford excellent building stone but produce a series of marked scarps where

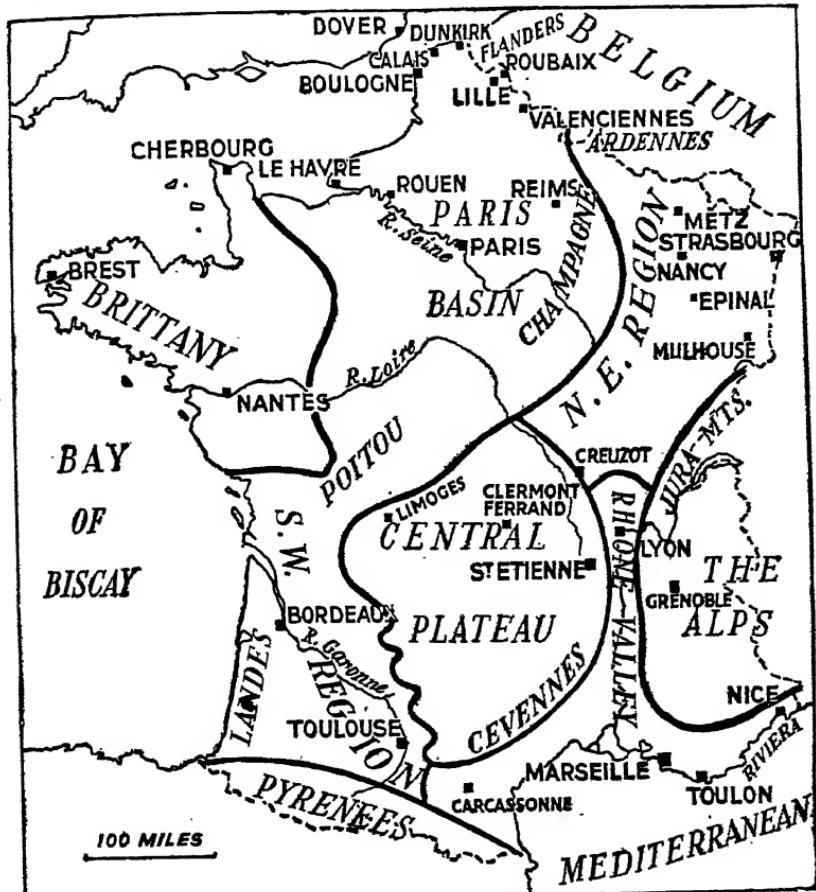


FIG. 185.—The natural regions of France.

cut through by river valleys, thus affording the characteristic scenery of the heart of the basin. Surrounding the Tertiary beds is a broad ring of chalk, cropping out in the downs of Artois, Picardy, Champagne "pouilleuse," and Normandy. Surrounding the chalk is a ring mainly of Jurassic rocks, beyond which are the ancient massifs which surround the basin. The great rivers of the north of France have cut up the Paris Basin into a series of "blocks" of country which have received distinctive names from

the French. The varied geology thus affords striking contrasts within the basin between these different "pays." There are the chalk plains of Picardy with their covering of fertile "loess" (or *limon* of the French), the bare chalk hills of Artois; the fertile valleys of Soissonnais; the forested plateau of Brie; the treeless limestone plateau of Beauce, all affording startling contrasts. The contrasts are even more marked than in the scarplands of south-eastern England, and this must be borne constantly in mind in any attempt to generalize on the Paris Basin. Broadly speaking, however, the Paris Basin is the great agricultural region of France, wheat, barley, and root crops being of first importance, with sheep on the drier hills, cattle in the damper areas. In the centre lies Paris, to the north-west its great ports of Rouen and Havre; to the north lies the great industrial region of France, the presence of which is determined by the coal field which underlies the chalk hills. The great coal-field towns include Lille, Roubaix, Tourcoing, Valenciennes, Arras, and others; the port of Dunkirk is the main outlet, Calais and Boulogne serving mainly for cross-Channel traffic.

The Armorican Massif.—This area of old rocks in which the dominant folds have an east-and-west (or "Armorican") trend occupies the province of Brittany and western Normandy. The region is broadly comparable with Devon and Cornwall on the opposite side of the Channel. Much of the ground is too infertile or too exposed to the prevailing westerlies for cultivation, and the life of the region centres in the valleys. Too damp for wheat, the leading cereals are oats, barley, and rye; orchards of apples, pears, and plums are numerous. As in Devonshire, large quantities of cider are made from the apples, and there is an export trade in fruit. The orchards in many areas serve also as small corn fields; near the coast and towns market gardening predominates. Cattle are numerous in the valleys; sheep thrive on the hill pastures and gave rise at an early stage to the textile industries of Rennes and Leval. The former town, as a result of the early impetus of the woollen industry, is now one of the leading cotton manufacturing towns of France. Fishing is important round the coasts, and the conditions which have made the fishermen of Cornwall famous in history, have made the men of Brittany their rivals in this regard. The kinship of the Welsh, Cornish, and Bretons brings the analogy between the English and French Armorican area even closer.

South-Western France.—Lying between the Armorican Massif on the north, the Central Plateau on the east and the Pyrenees on the south, is a broad lowland region, floored very largely by Tertiary rocks of the Basin of Aquitaine. In the north is the lower Loire basin, centring on Nantes and where Poitou forms the transitional area between the Central Massif and Brittany, the Paris

Basin, and the Aquitaine Basin. Further south one passes into maize-growing country and into the great red-wine region of Aquitaine, centring on the town of Bordeaux and the lower Garonne. To the south of Bordeaux lies a large and remarkable tract of country—the Landes. Formerly a waste of dangerous shifting sand dunes which threatened the fertile land to the east, this is now one vast plantation of pines, covering hundreds of square miles.

The Central Plateau.—The ancient rocks of this central massif furnish but a poor soil, so that, despite a good rainfall, rye and sheep are the dominant notes in the agriculture. The life of the region, on the whole sparsely populated, centres on the little coal fields and the industrial towns such as Creuzot, St. Etienne, Alais, and Clermont Ferrand which have resulted therefrom, or on the volcanic soils of the Puy de Dôme district and Cantal in the region long known as the Auvergne where the volcanic soils of the valleys are rich. The high south-eastern edge well marks the limit of the Mediterranean *régime*, the waters of the plateau drain towards the north-west, and it is with the climate of the north-west of France that that—much more severe—of the central plateau is linked. The region is large, it covers a sixth of the whole of France. Limoges is a leading town and a centre of the north-west of the plateau.

The Pyrenees.—The succession of chains which constitutes the Pyrenees forms a remarkably complete barrier between France and the Iberian peninsula. Much of the higher parts of the mountains are covered with treeless hill pastures tenanted in summer by herds of sheep and by cows. The valley slopes are forested with pines and oaks and other trees; whilst in the valleys nestle little villages surrounded by their fields of maize and barley. Formerly neighbouring valleys were cut off from one another to a remarkable degree—an isolation reflected in sudden changes in domestic architecture, but the isolation has now largely been destroyed by the ubiquitous motor bus. At the foot of the Pyrenees lies an extensive plain—the subpyrenean plain—which forms the transition area to the Aquitaine Basin on the west, stretches to the edge of the central plateau in the centre and fades into the Mediterranean lowlands on the east. The plain is built up of huge quantities of material washed down from the mountains, and the rivers render cultivation difficult by their sudden floods. Toulouse and Carcassonne guard the gap which separates the Aquitaine Basin from the Mediterranean lowlands.

The Rhone Valley and Mediterranean France.—The valley of the Rhone and its principal tributary the Saône lies between the Burgundian Heights (or the Côte d'Or) and the Cévennes in the west and the Jura and Alps on the east, and forms a “couloir” which

has been of the greatest importance throughout history. It is to-day the great line of communication between Northern France and the Mediterranean; a fertile, picturesque valley where the firs and beeches of the north give place to the cypresses and olives of the south. Aspect is of importance in the valley; the vineyards of Burgundy are on southward facing slopes. The silk-manufacturing town of Lyons—no longer dependent upon the limited local supplies of raw silk—is the focus of the northern part of the valley and its growth has been assisted by the near-by coal field of St. Etienne. West of the mouths of the Rhone lies an important wine and olive country, but to the east the Riviera finds its main economic importance in its fame as a winter resort. It should be noted that Marseilles is not on the mouth of the Rhone but lies in a mountain-girt bay to the east, hence the importance of canal communication with the Rhone. Marseilles has a very large trade with India and the East, importing linseed, sesamum, ground-nuts, and copra for her oil and soap factories. Eastern mails to and from England are transferred from steamer and train at Marseilles—less than 24 hours by rail from London. The great shipping trade of Marseilles has caused the development of shipbuilding industries. East of Marseilles is the naval station of Toulon. The great centres of the French Riviera are Cannes and Nice.

The French Alps.—The great mass of the Alps which lies in French territory is penetrated by transverse valleys which have acted as avenues of penetration and have allowed the people and the life of the plains to penetrate far into the mountain mass. Grenoble is the outstanding example of a large town in the heart of the Alps. On the other hand, there are the "high valleys" of the Alps with their little villages of alpine pastoralists so different in character and isolated from the outside world. The important hydro-electric installations of the Alps have already been noted.

Alsace-Lorraine and the East of France.—Geographically the east of France may be grouped as a whole as the "Rhine Region," but it really comprises at least three units—the portion of the Rhine valley which lies in Alsace; the forested Vosges and Basses Vosges; the Lorraine plateau which lies to the west of the Vosges. The rich plains of Alsace centre on Strasbourg and Mulhouse, and with their busy agricultural population afford an interesting contrast to the great massif of the Vosges, a block of forested, granitic country but sparsely inhabited. The Lorraine plateau with its great iron ore deposits might be considered the outermost ring of the Paris Basin, since it consists largely of Jurassic deposits matching those on the far western side of the basin. The valley of the upper Meuse which lies west of the plateau may be held more probably to bound the Paris Basin. Amongst the towns of Lorraine, Nancy

and Epinal may be noted as textile centres originally dependent on local wool supplies and benefiting from the pure water supplies from the Vosges.

Corsica.—Corsica is a mountainous island nearly half the size of Wales, famous as the birthplace of Napoleon. As in many mountainous islands, the population is found mainly round the coasts, so that Ajaccio is the chief port as well as the chief town. With the development of roads, the island, with its fine scenery, is sharing the popularity of the Riviera as a holiday resort.

SPAIN AND PORTUGAL

Position.—The Iberian Peninsula, comprising the republic of Spain, the republic of Portugal, and the tiny British possession of Gibraltar, has an area of 225,000 square miles and a population of 28,000,000. Lying between latitudes 36° and 44° , nearly the whole is in the "Mediterranean Belt" excepting only the northern strip. Portugal occupies a compact block of the west coast with an area of 34,000 square miles, but it will be convenient to consider first the peninsula as a whole.

Physical Features.—The heart of the peninsula consists of a great plateau, the meseta, for the most part between 2,000 and 3,000 feet above sea-level. The plateau is bounded on the north-west by the mountains of the old massif of Galicia and on the north by the Cantabrian Mountains, which are continued eastwards into the Pyrenees. The Sierra Morena forms the southern limit of the meseta and running obliquely across its centre is the Central Dividing System. To the north-east of the meseta lies the deep trough forming the Ebro Valley. To the south of the meseta is another trough, occupied by the Guadalquivir Valley, which is separated from the Mediterranean by the fold range of the Sierra Nevada. The Douro, the Tagus, and the Guadiana have broad valleys in the lower courses in Portugal, so that on the west the edge of the great plateau is less clearly defined.

Geology and Minerals.—Broadly speaking, the Iberian plateau consists of a stable block of ancient rocks, partly covered with younger sediments, against which the Pyrenean-Cantabrian system was folded on the north and the Sierra Nevada or the Penibetic system (a continuation of the Atlas) was folded on the south. The position of the two great valley regions, the Ebro Valley and the Guadalquivir Valley, is determined mainly by two tectonic troughs. The Iberian peninsula as a whole is rich in minerals, and, as shown in Fig. 186, the interest centres on the northern fold ranges (the Cantabrians); the southern fold ranges (the Sierra Nevada), and the southern fringe of the plateau (the Sierra Morena). Taking Spain alone, in 1930 no less than 150,000 persons were employed in

connection with the mining industries and the total value of the output was 500,000,000 pesetas (£18,500,000 or \$92,000,000).

Mineral	Quantity in metric tons		Value £ millions	
	1925	1933	1925	1933
Coal	5,800,000	5,430,000	7·1	8·6
Anthracite	320,000	570,000	0·4	1·1
Lignite	400,000	300,000	0·3	0·4
Lead	210,000	110,000	4·6	0·9
Copper ore	3,700,000	700,000	2·9	0·6
Iron ore	4,500,000	3,390,000	1·7	0·6
Zinc ore	170,000	90,000	0·8	2·8
Mercury	22,600	10,000	0·2	0·1
Sulphur	—	50,000	—	0·1

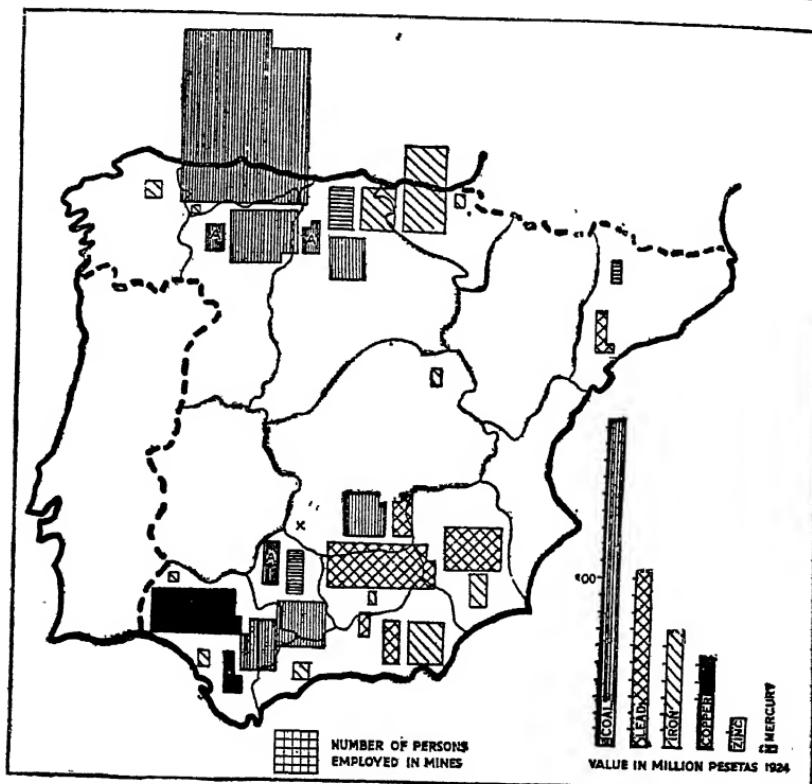


FIG. 186.—The minerals of Spain.

The shaded areas on the map are proportioned to the number of men employed, each small square of the index representing 100 people.

Other mineral products include salt, manganese, tin, and phosphorite. The output of cement reached a value of over £2,000,000 in 1925. Most of the coal is mined in the north, the great centre

being Oviedo, but there are also important mines in the south, in the Sierra Morena of Cordoba province and in the Guadalquivir Valley. The lead is mainly from the south, from the Sierra Nevada and Sierra Morena; the big production of copper almost entirely from the western end of the Sierra Morena in the hinterland of Huelva. Many parts of Spain are rich in iron ore, but the principal workings are in the north (Santander and Oviedo) and in the south along the Sierra Nevada. The zinc, also, is from the north (Santander) and south (Granada). Spain's important output of mercury is still mainly from the famous mines of Almaden in the south-western corner of New Castile.

Portugal is, by comparison with Spain, less richly endowed with mineral wealth. Coal is scarce and the want of fuel handicaps the exploitation of the wolfram, iron, copper, manganese, and other minerals which do exist.

Climate and Vegetation.—There is marked distinction between Northern Spain, which has a north-west European type of climate with a good rainfall well distributed throughout the year, and the remainder of the peninsula, which belongs as a whole to the Mediterranean region. It is true, however, that the Central Mountain Divide, by virtue of its elevation, attracts a higher rainfall, and is to a considerable extent covered with forests comparable with those of the northern mountains, so that it is regarded by some as an "outlier" of the north-west European type of climate. The northern part of the meseta may be regarded as transitional in type between North-west European and Mediterranean.

Quite apart from this distinction there is the broad twofold division of the peninsula into the northern and western "pluviose" portion and the central, southern, and eastern "arid" portion. Although the rainfall *régime* of most of the plateau is Mediterranean, *i.e.* there is a rainfall maximum in winter and a dry summer, the elevation results in winters too cold for typical Mediterranean vegetation—for example citrus fruits are absent. Hence the vegetation of much of the high interior is best described as dry steppe land. Forests are important in the northern mountains of Spain, and in Portugal cork from the cork oak forests is one of the great sources of wealth. Resinous pine trees are important in Spain.

Agriculture.—Spain is a predominantly agricultural country. More than 90 per cent. of the surface is classed as "productive," although only 45 can be classed as under production. In Portugal half the country is waste, 17½ per cent. is forested, 26 per cent. under crops (excluding 3½ per cent. under vines), and 4 per cent. under fruit trees.

The following table shows the leading crops of Spain:

Crop	Millions of acres	
	1926	1933
Wheat	10.8	11.2
Barley	4.5	4.7
Oats	1.9	1.6
Rye	1.9	1.5
Maize	1.0	1.1
Peas and beans	2.1	—
Rice	0.1	0.1
Olives	4.1	4.6
Vines	3.3	3.5
Fruits	1.1	1.2

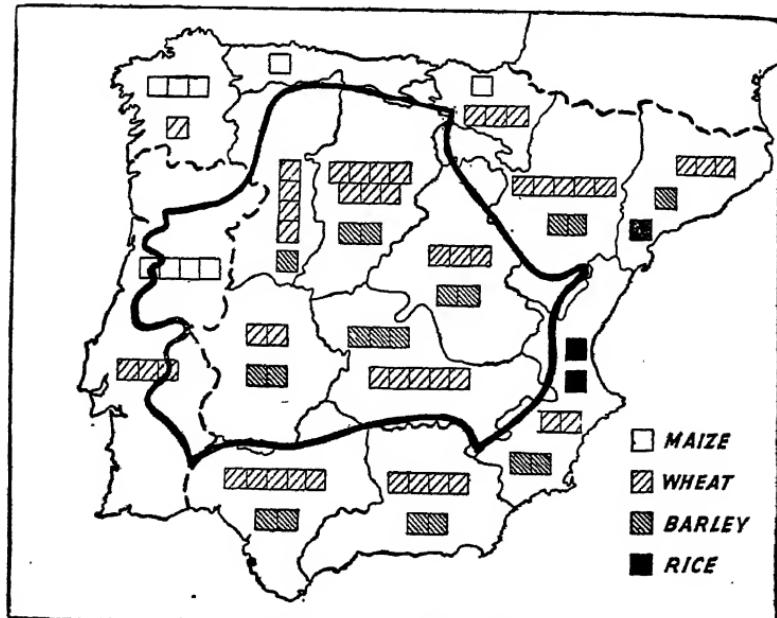


FIG. 187.—The cereal production of Spain (based on 1924 production).

The meseta is enclosed by a heavy black line and the importance of wheat and barley in this area is noteworthy; maize almost exclusively in pluviose Spain; rice in the east. Each square represents approximately 100,000 tons of grain.

The distribution of these crops is influenced in a remarkable way by the climate. Most of the wheat and barley is grown on the plateau (especially the northern meseta) and the Mediterranean coastlands, and there is very little in the wetter parts of the north and west. The maize, on the other hand, is almost entirely restricted to the wet north-west; the rye to the poor, dry soils of the north-western part of the plateau. Rice grows in certain sheltered irrigated tracts along the Mediterranean coast. Fig. 188

shows the limits of the olive tree and citrus fruits. The annual production of red and white wines is very large (600–800 million gallons), the largest production being from the Tarragona and Barcelona areas. Wines of the sherry type (taking their name from an English corruption of Jerez near Cadiz) are from the south-west; ports from the lower Douro basin in Portugal (shipped through Oporto). The drying of fruits is concentrated along the Mediterranean coast, the principal region also for sericulture.

The localization of animals in the Iberian peninsula is remarkable. Spain has 3·8 million cows, and Portugal 0·77 million, they are concentrated in the moist regions of the north and west. Spain

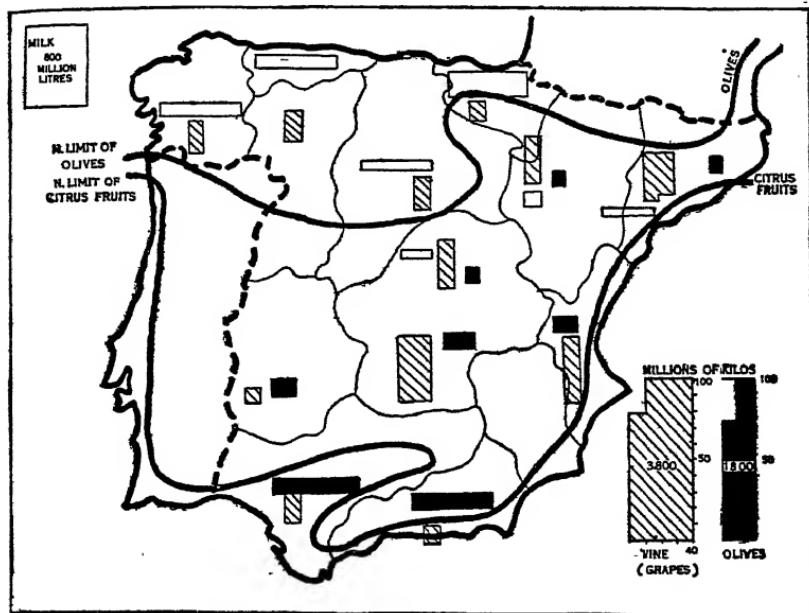


FIG. 188.—Production of grapes, olives, and cow's milk in Spain.

Notice the concentration of dairy farming in the wet north and of olive cultivation in the Mediterranean south.

has 20·1 million sheep and 4·7 million goats (1931)—Portugal has 3·7 million sheep, and 1·6 million goats (1931); they are nearly all to be found on the dry regions of the plateau. Reference must be made to the seasonal movements of sheep and shepherds from the winter pastures on the plateau to the highland summer pastures amongst the mountains. Pigs are more widely distributed (5·2 million in Spain, 1·1 million in Portugal in 1931).

Fisheries.—The fisheries of Spain employ about 130,000 of the population, the value of the catch in 1931 being 265,000,000 pesetas—mostly sardines, tunny fish, and cod. The canning and preserving factories alone turn out products to the value of 500,000,000 pesetas. Portugal has also important fisheries, centring

on Setubal. The north-western coasts of Spain rank first, followed by the Mediterranean coasts.

Population.—Spain, with a population of 22,000,000, and

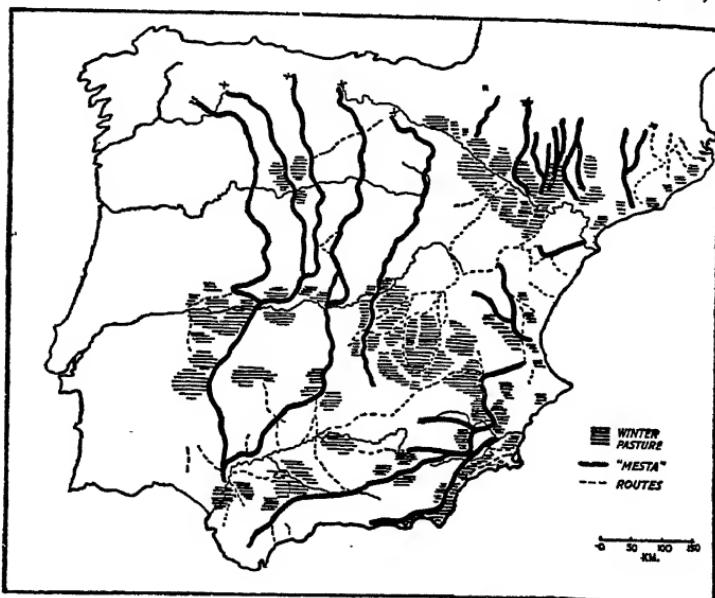


FIG. 189.—The migration of sheep in Spain—past.
“Mesta” main routes recognised by federations of sheep and cattle owners.

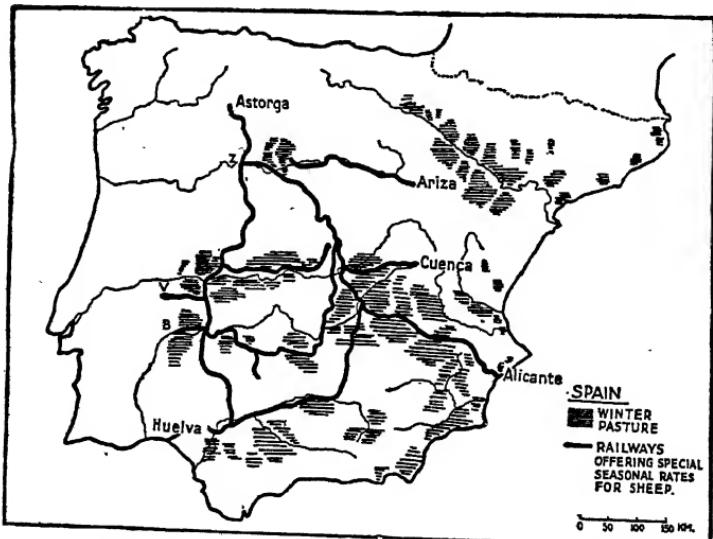


FIG. 190.—The migration of sheep in Spain—present.

Portugal, with 6,650,000, are both somewhat thinly populated. The density in Spain (1933) is 123; in Portugal (1930) 187. It is interesting to notice that population, development, and towns are

all concentrated in the regions surrounding the central plateau—the “dry heart” of the peninsula. Of the 12 towns, 10 in Spain and two in Portugal, with a population of over 100,000 in 1923,

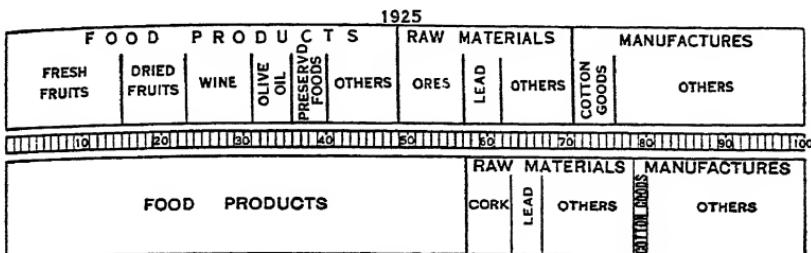


FIG. 191.—The exports of Spain.

no less than 9 are ports, and only one—the capital of Spain—lies on the plateau.

Manufactures.—Spain cannot be described as a manufacturing country, though she now has important manufactures of cotton

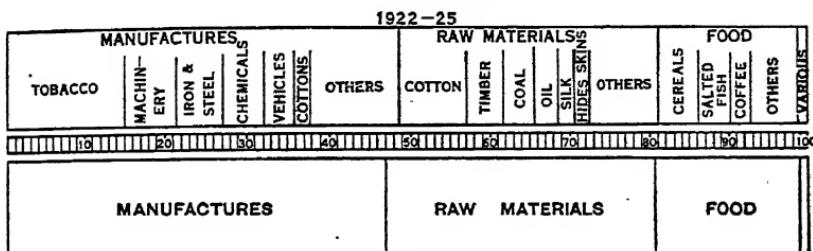


FIG. 192.—The imports of Spain.

goods, mainly around Barcelona, of woollen goods and of paper (from the esparto grass of the plateau). Other industries include glass-making, flour-milling, fish-canning.

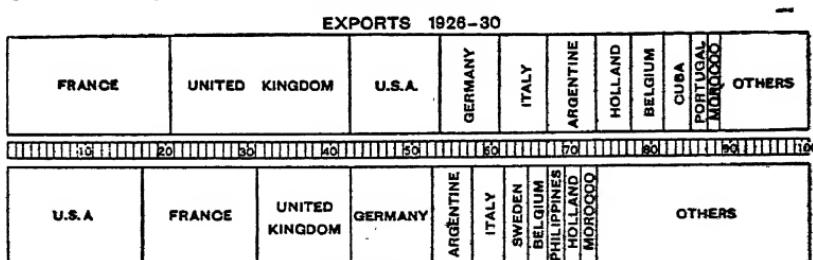


FIG. 193.—The direction of Spanish foreign trade.

Communications.—The Douro and Tagus are both navigable through Portuguese territory to the Spanish border; the Guadalquivir by ocean-going steamers to Seville, and by other craft to

Cordoba and the Ebro beyond Zaragossa. Otherwise the railways form the principal means of communication. There are 11,500 miles of railway, mostly on the gauge of 5 feet 5 $\frac{1}{4}$ inches.

Foreign Trade of Spain.—It will be noticed from the diagrams that the export trade of Spain, which averaged £35,000,000 in value in 1931–4, consists mainly of foodstuffs—wine, fruits, etc., and raw materials, especially metals. The imports in the same years averaged £40,000,000 and consist mainly of manufactured goods.

NATURAL REGIONS OF SPAIN AND PORTUGAL

Northern Spain.—Northern Spain comprises broadly that part of the peninsula which has the North-west European type of climate. Though hilly or mountainous throughout, it is one of the important parts of Spain, and the fertile valleys are among the most densely populated. The whole area may be divided at once into three subdivisions :

The Galician Massif, including the plateau region of Portugal which lies north of the Douro River, in many ways recalls the Brittany Massif of France. Poor, granitic soils do not encourage agriculture, but the rainy equable climate gives a natural vegetation of meadow and deciduous forest. Cattle and maize are the keynotes of the region, the drowned coast with its “rias” is the great fishing ground of Spain.

The Cantabrian Mountains include the great coal and iron region of Spain. Oviedo is the coal town ; Santander, by virtue of fairly easy access to the interior, serves as the northern port of Madrid. The mountains are lower to the east (Basque mountains), where there are more opportunities for agriculture and general development which has been aided by the energy of the Basque people. Bilbao and S. Sebastian lie in this area.

The Pyrenees are higher than the Cantabrians. The water power resources have been utilized towards the east, but less so than in France. About a million horse-power is actually developed in Spain ; the Pyrenees, followed by the Cantabrians, are the leading regions. In particular the R. Segre, a tributary of the Ebro, has been utilized.

The Meseta.—The great central plateau also falls roughly into three divisions :

The Northern Meseta corresponds roughly with the upper Douro Basin, lying in the provinces of Leon and Old Castile, and hence sometimes called the basin of Old Castile. This is, *par excellence*, the wheat region of Spain, centred round the milling town of Valladolid. Too cold in winter for the olive and the Mediterranean fruits, too arid for the forests of the north-west, it is a “transition region.”

The Central Dividing Ranges are forested (though now largely cleared), and in this respect resemble the Cantabrians.

The Southern Meseta corresponds roughly with the basins of the upper Tagus and Guadiana, including the "basin of New Castile." It is a region of poor heathlands not always sufficiently moist to furnish even winter sheep pastures. The capital lies in the northern part of the New Castile Basin, Toledo towards its centre. Forests of the typical Mediterranean oaks, though stunted, cover some of the area, and the olive is found over most of the region.

The Guadalquivir Valley.—This valley lies between the edge of the meseta (the Sierra Morena) and the Sierra Nevada or the Andalusian Cordillera, and corresponds with the Andalusian trough. In this warm, sheltered region of Southern Spain, Mediterranean

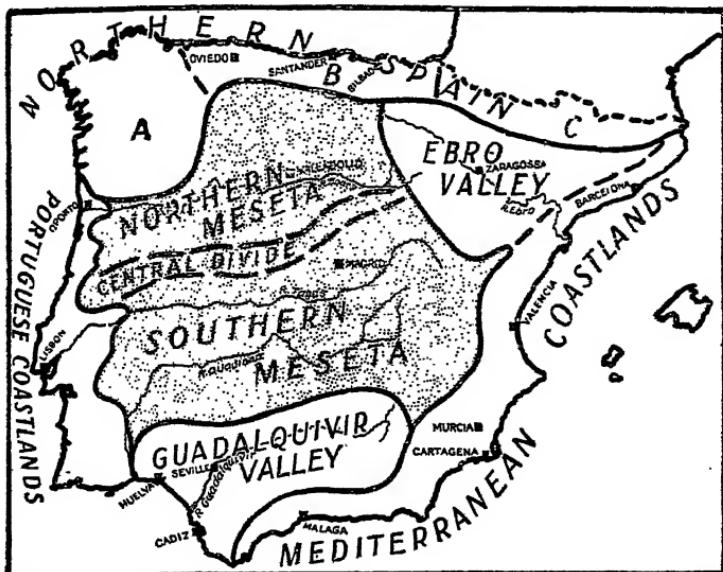


FIG. 194.—The natural regions of Spain and Portugal.

fruits flourish; the very name of Seville is ineradicably associated with oranges as that of Jerez (near Cadiz) is with sherry. Granada lies in the heart of the Andalusian mountains.

The Mediterranean Coastland.—This long strip consists actually of a number of isolated tracts of cultivable land, backed by high mountains and separated by spurs of upland. The whole region is sunny but very dry, lying as it does in the lee of the plateau. It is along the Mediterranean coastland that irrigation assumes a paramount importance; on the terraced hillsides are fruit gardens, on the alluvial flats at the mouths of the rivers an intricate system of channels and pipes irrigates the huertas and vegas. A huerta has normally two harvests a year, a vega only one. In the huertas an elaborate system of crop rotation is practised, wheat, maize,

beans, hemp, are among the leading crops; the vegas are largely devoted to fruit trees. The vines and olives are mainly on the higher, drier grounds; in the dampest parts near the lagoons, banked in by coastal sand dunes, rice is grown. The towns have grown up as natural centres of the more important areas: Malaga and Almeria in the south, where Moorish influence is marked in many ways—not least in the architecture of the flat-roofed houses. Farther north Cartagena, Alicante, and Valencia are all in tracts celebrated for their fruits. North of the Ebro mouth the climate is moister, and Tarragona and Barcelona are centres of the great wine-producing region of Spain, whilst Barcelona rivals Marseilles on the other side of the Gulf of Lions as an industrial centre—with cotton, woollen, machinery, and other manufactures.

Murcia is the only inland centre of note.

The Ebro Basin.—This depression is cut off from the Mediterranean coastlands by the Catalonian hills, and though Mediterranean in climate, is slightly more continental. Large tracts are irrigated, and a variety of crops grown. The valley centres on the old bridge town of Zaragossa.

Portugal.—In many ways the cultural background of Portugal, with its long association with Britain, is very different from that of Spain.

There are many other contrasts between the two countries. Portugal comprises the following regions: (a) A northern plateau which has already been mentioned as comparable with Spanish Galicia. (b) A hilly, well wooded north central region, north of the Tagus, with an adequate rainfall, a land largely farmed by small farmers from isolated farms or scattered villages. Here maize is the grain of the wetter, lower lands; rye of

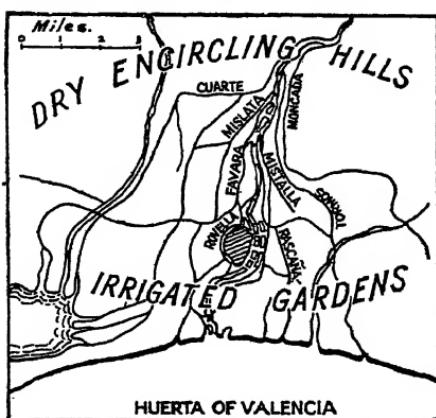


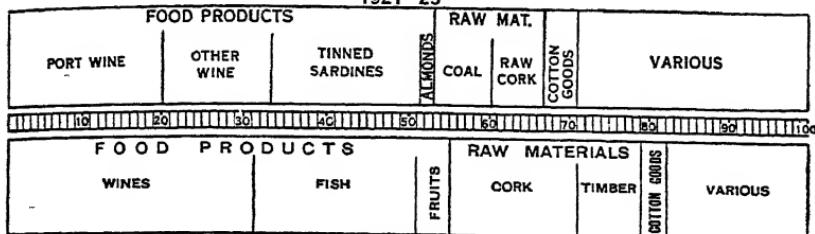
FIG. 195.—The Huerta of Valencia on the east coast of Spain.

the hills; acorns from the oak forests provide food for pigs. The vine is largely cultivated and wine made for local use, but the famous Port wine area is the dry sheltered middle Douro valley. The vines are grown on terraces in the gorge like valleys and the wine shipped from Oporto, Portugal's second town. (c) A gently rolling steppe-like country with nucleated hill-top villages (originally for protection against the Moors) with huge stretches occupied by wheat, barley and other crops. The climate is drier and of distinctly Mediterranean type, and donkeys or asses replace the

universally used oxen of the north. There are extensive cork-oak forests, and some olive groves. (d) The southern *Sierra* or mountains separate the last region from (e) the *Algarve*, a narrow strip along Portugal's southern coast with a climate and products like those of north Africa.

It should be noted that Lisbon is not only a fine city and port, but is centrally placed in relation to the regions of the country.

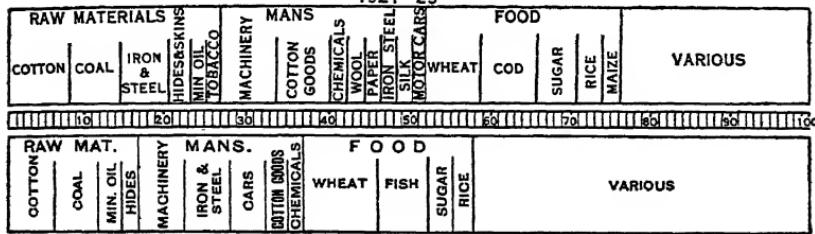
VALUE 1921-25, £6,000,000
1921-25



1926-30
VALUE 1926-30, £7,000,000

FIG. 196.—The exports of Portugal.

1921-25



1926-30
VALUE 1926-30, £15,000,000

FIG. 197.—The imports of Portugal.

GIBRALTAR



FIG. 198.—The position of Gibraltar—the key to the Mediterranean.

Gibraltar, the "Key of the Mediterranean," has been a British possession since 1704. Its position at the eastern end of the Strait of Gibraltar (here 13 miles wide; at its narrowest 8 miles) should be carefully noted. The town is built on the eastern side of a small rocky peninsula, the Rock of Gibraltar, and is a strongly fortified naval station. It is also a free port and a coaling station, and to the west of the Bay of Algeciras forms a large harbour.

In the open Atlantic, nearly a thousand miles west of Lisbon, lie the Azores, under the dominion of Portugal, whilst five hundred miles south-west of Lisbon is the Portuguese island of Madeira. The Spanish Canary Islands, nearer the coast of Africa, are in the same latitude (roughly 28°) as the northern part of the Sahara. Both Madeira and the Canaries combine the sunny skies of the southern Mediterranean or even the Sahara with the advantages of a comparatively equable oceanic climate and are favourite winter resorts.

ITALY

The kingdom of Italy is slightly smaller than the British Isles, and, with a population of over 41,000,000, everywhere the average density is high. The natural limits of the country are well defined; by the Alps on the north and by the sea on all other sides. There are, in the presence of a high mountain wall and a great northern plain (the Plain of Lombardy) and a hilly peninsula to the south, some points of general resemblance to India. The Apennines form the backbone of peninsular Italy; it should be noticed that they lie very close to the sea in the north-west; swing across to the east coast, and then return to the south-west to pass through the "toe" of Italy into Sicily. The climatic variations in Italy depend largely upon the topography, and so the principal physical regions are also climatically distinct. Italy may be divided primarily into:

- (a) The southern slopes of the Alps in the north.
- (b) The great plain of Lombardy or the plain of the Po.
- (c) Peninsular Italy, in which several subdivisions may be distinguished.

Most of Peninsular Italy has a typical Mediterranean climate, but the plain of Lombardy is cut off from the influence of the Mediterranean by the Apennines, and has very cold winters, with a spring or early summer rainfall maximum.

The Italian Slopes of the Alps face towards the south and towards the sun, and are thus warmer than they would otherwise be. This is particularly so as many of the valleys run north-and-south and open out southwards. Some of the valleys are partially blocked at the southern end, giving rise to the beautiful Italian lakes, visited annually by thousands of tourists. These warm,

Alpine valleys are, in fact, oases of Mediterranean vegetation, where such fruits as the olive and vine flourish. The Alps give place somewhat abruptly to the plains, and along the borders are many towns using electric power obtained from the swift Alpine streams.

The Plain of the Po is the most fertile part of Italy, and supports nearly half the population. The plain is hemmed in on all sides by mountains, except towards the east. Formerly a gulf of the Adriatic, its surface has been built up by the enormous quantity

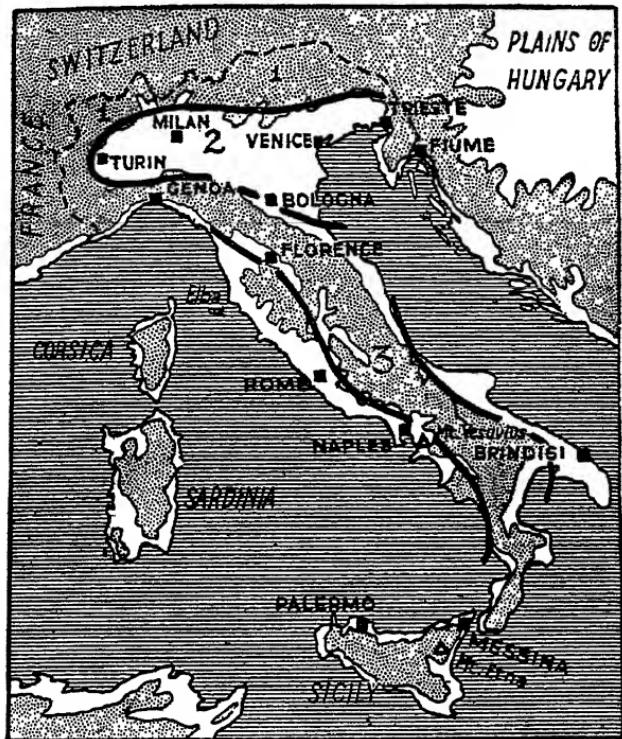


FIG. 199.—The natural regions of Italy.

Land over 1,000 feet, dotted. 1. The Alpine slopes; 2. The Plain of Lombardy; 3. Peninsular Italy.

of silt brought down by the Alpine streams. It is interesting to notice that the Po itself lies towards the south ; the result of the greater swiftness of the tributaries coming from the north. In the east the plain is low-lying and subject to floods ; less so in the west, though everywhere there is a tendency for the rivers to silt up their beds so that the water-level between the embankments is often above the level of the surrounding plain. The whole is a great agricultural area ; wheat, maize, and rice are the leading cereals. This is the leading rice-growing area of Europe, the rice being grown

under irrigation in the west and around the delta in the east. Cattle-rearing and dairy-farming (including the production of cheese) are important industries, and great use is made of the pasture lands of the encircling limestone hills. Mulberry trees grow throughout the plain and have led to this region becoming one of the great silk-producing areas of the world. Silk-spinning is carried on in Como, Milan, and Bergamo; silk-weaving is centred at Milan which vies with Lyons as the premier silk-manufacturing centre of Europe. The supply of cheap hydro-electric power more than compensates for the absence of coal, and together with the supplies of cheap, skilled labour, has attracted other industries to the towns of the

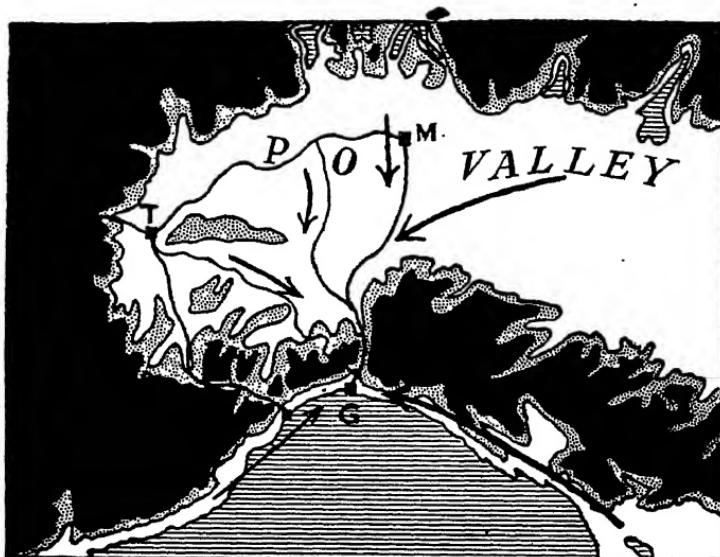


FIG. 200.—The position of Genoa.

Notice the gap to the north of the town, followed by the railway to M. (Milan). The smaller town to the west of Genoa is Savona. Notice the gap leading to T (Turin). The arrows show the railway routes along the coasts and from the Po Valley. Land above 1,500 feet, black.

northern plain. Cotton and woollen goods are manufactured, the cotton being imported from the United States and the East, and cotton goods are taking an increasingly important place in Italian exports. There are also hemp and jute factories, the home production of hemp being an important branch of Italian agriculture.

Milan is the nodal point for the western portion of the plain. It is the natural junction of the east-west routes with the north-south routes and several trans-Alpine railways converge on Milan. It is only natural that it should have railway workshops and heavy industries. *Turin* commands the Mont Cenis route, and its modern automobile industry is the modern descendant of the old carriage-repairing and smithy's business of such a route town. The historic

town of *Venice* would appear from a casual glance at the map to be the natural outlet of the plain, but it has been supplanted in this respect by Genoa, across an important pass in the Apennines. *Verona* and *Padua* are two other towns of the northern group; *Bologna* is the collecting centre of the south-east of the Plain. It should be noted that *Trieste* and *Fiume*, though situated in Italy, owe their importance to their being outlets for Central Europe.

Peninsular Italy is divided by the Apennines into an eastern and a western portion. Actually, it is convenient to consider five sub-regions—the Northern, Central, and Southern Apennines; the Western Coast, and the Eastern Coast.

The Northern Apennines in the north-west are continuous with the Maritime Alps. The mountains drop sharply to the sea and there is no coastal plain along the Italian Riviera. The Altare and Bocchetta passes have determined respectively the positions of Savona and Genoa, and the latter has permitted Genoa to serve as the main outlet of the Po Basin. Favourable lower slopes permit the growth of Mediterranean fruits; characteristic oak-chestnut forests cover other slopes. The marble of Carrara is world famous.

The Central Apennines are broader than the northern, and comprise a large stretch of barren inhospitable limestone country with a Karst type of scenery.

The Southern Apennines are again narrower and include many volcanic areas.

The Western Coast cannot be described as a coastal plain, but consists of a tangled mass of volcanic hills, isolated peaks, and plains. The rainfall is heavy, being exposed to the full force of the westerlies. Formerly the low lands were marshy and malarious but the swamps have now been very largely drained. Much of the volcanic soil is highly fertile, especially around Naples, maize and wheat being the leading cereals with the vine and olive tree also of great importance. *Rome*, at the head of navigation on the Tiber, is the political capital of the country, as well as the seat of the Vatican. *Naples* has developed recently into a great industrial city. There is an abundant supply of cheap unskilled labour and the development of industries—notably textiles, sugar-refining, and motor-engineering—has been carefully fostered by local authorities. *Leghorn* is the other great centre and port of the Western Coast. The famous iron ores of Elba are smelted on the coast of the mainland near by. *Florence* is an old seat of learning and art.

The Eastern Coast is narrow except in the south, where it merges into the peninsula of Apulia. The east coast is drier than the west.

The Island of Sicily is famous for its fruit, particularly lemons, and silk; its largest town, Palermo, carries on iron-smelting;

Messina is only recently recovering from its destruction by earthquake in 1908. Sulphur from the volcanic regions is a noteworthy product. The island of Sardinia has rich mineral deposits, but is still undeveloped.

Communications of Italy.—The directions followed by the railways are determined very largely by the mountain chains. The convergence of trans-Alpine routes on the northern plain should be carefully noted. Brindisi formerly occupied the place of

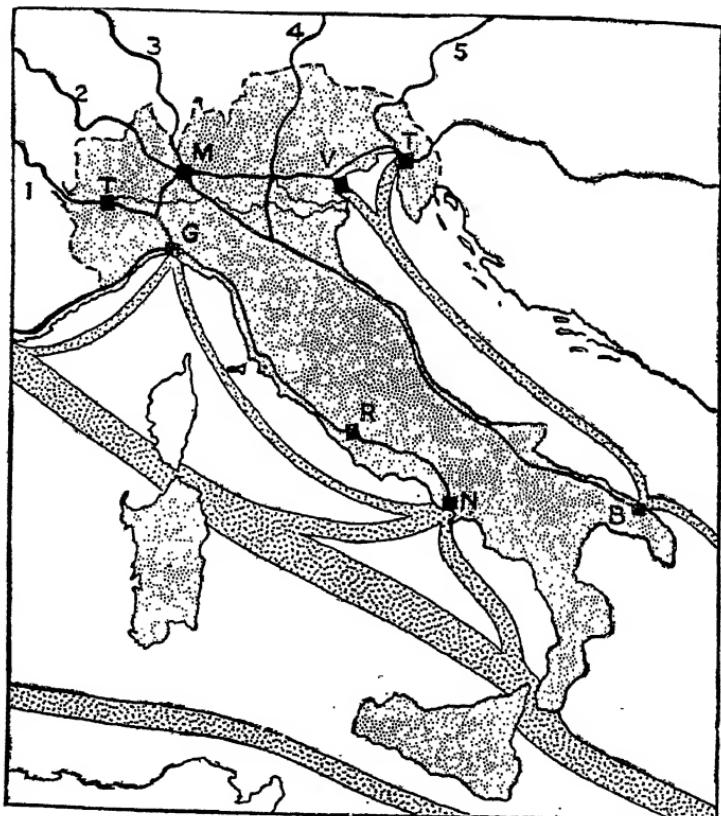


FIG. 201.—The railways and steamship routes of Italy.

Identify carefully each of the towns marked by letters and each of the railways through the Alps marked by numbers.

Marseilles as the port of call for steamers taking on English mails for India and the Far East, but various reasons have prevented the post-war return to this arrangement. Among navigable waterways only the Po and certain of its tributaries are of importance.

Population.—Italy is, broadly speaking, over-populated. Poverty is widespread and the standard of living is low. Consequently large numbers of Italians emigrate, formerly to North America, now especially to European countries and to South

America. In the years 1901–1913 the annual number of emigrants exceeded 600,000; in 1930–1933 it was about 180,000. The Italians cannot emigrate to their own colonies to any great extent, for Italy's only possessions until the annexation of Abyssinia in 1936 were three areas in Africa, largely desert. These were Libya, Eritrea, and Somaliland, the two latter now part of Italian East Africa. Thus over 9,000,000 Italians live in foreign countries.

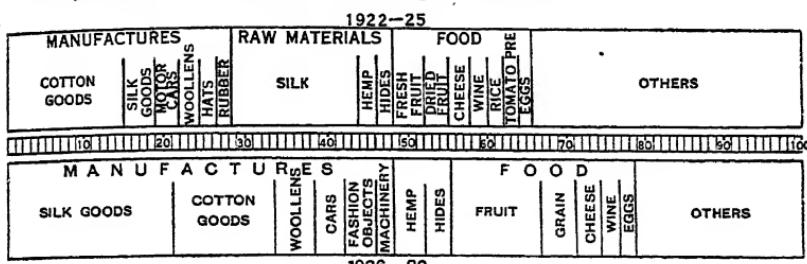


FIG. 202.—The exports of Italy.

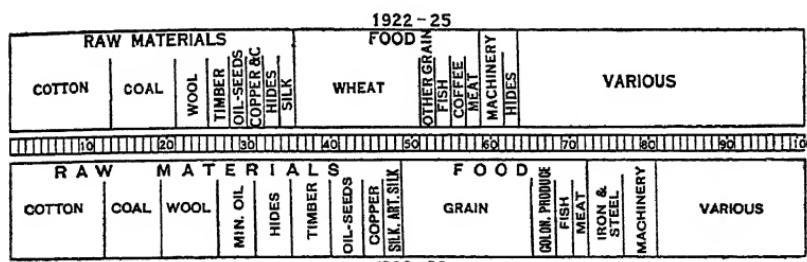


FIG. 203.—The imports of Italy.

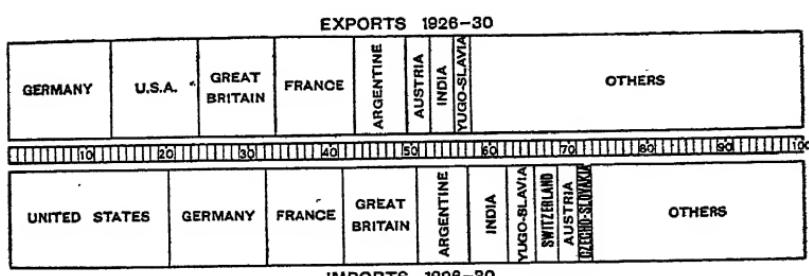


FIG. 204.—The direction of Italy's foreign trade.

Foreign Trade.—The unfavourable balance of trade is noteworthy. Among the imports the high place taken by wheat indicates the shortage of food; the rapidly increasing import of raw cotton bears witness to the expansion of the cotton manufacturing trade, the cotton is mainly from the United States and India. Italy's large import of coal comes mainly from Great Britain and Germany. Among exports the high place occupied by cotton goods is noteworthy.

MALTA

Between Sicily and the nearest point of Africa lie the two islands of Malta and Gozo. Just as Gibraltar is the key of the Mediterranean, these islands are the key to the route between the eastern and western parts of the Mediterranean. They have been British since 1814. The islands are dry and rather barren, and suffer badly from the dry Sirocco wind from the Sahara. The land is very carefully cultivated by terracing and, where possible, by irrigation; but enough food cannot be grown for the quarter of a million inhabitants, and much has to be imported. The importance of the islands is in their position—on one of the great trade routes of the world. Malta has a fine harbour (at Valetta) used as a naval base.

THE BALKAN PENINSULA

The third peninsula projecting into the Mediterranean basin from the continent of Europe is the Balkan Peninsula. Unlike Iberia and Italy, it is joined on to Europe by a very broad isthmus, and it is difficult to say where the peninsula actually begins. Nearly the whole is mountainous, and the chief areas suitable for human settlement are small, often isolated coastal tracts and some of the larger river valleys. The complex physiography is in the main responsible for two outstanding features of human life in the peninsula :

(a) The rise, from the time of the early Greeks onwards, of "city states," each corresponding with a fertile area surrounded by barren mountains and grouped around a central city as the hub of the human life of the whole.

(b) The persistence in the remoter mountain areas of peoples more primitive in culture and customs than anywhere else in Europe. The Albanians are still, or were until very recently, organized as hill tribes under a chieftain (organized on this basis they took part in the Great War), and until 1925 had no railways, no money, and no banks.

The structure of the peninsula is also responsible for the division of the whole into two climatic belts :

(a) The coastal fringe, where the climate is of the Eastern Mediterranean type with very hot, dry summers, and winters which are distinctly cold (Athens 47° F. in January, Salonika 41° F.).

(b) The mountainous area, which may be linked climatically with central Europe.

As a result of the Balkan wars and the Great War, political frontiers in the Balkan peninsula have been greatly changed even within the present century. If we define the peninsula as the mountainous area lying to the south of the Save-Danube lowlands, a large part of the north-west (the former Serbia and Montenegro)



FIG. 205.—The Balkans.

The heavy black lines show the main mountain divides.

lies in the kingdom of Yugoslavia; the north-west constitutes Bulgaria; Albania is an independent unit in the west, European Turkey in the east; whilst Greece occupies the whole of the south.

In the whole peninsula there are few rivers of importance for navigation, and the irregularity of the surface presents great difficulty in the construction of roads and railways. Indeed, from Belgrade (at the junction of the Save and Danube) no railway penetrates eastwards to the Adriatic; only one (to Salonika and Athens) to the south coast and the Mediterranean shores, and only one south-eastwards to Istanbul. Moreover, population over the whole peninsula is scanty and development is thus further hindered.

GREECE

The Kingdom of Greece includes the most typically Mediterranean portion of the Balkan peninsula. Its present boundaries

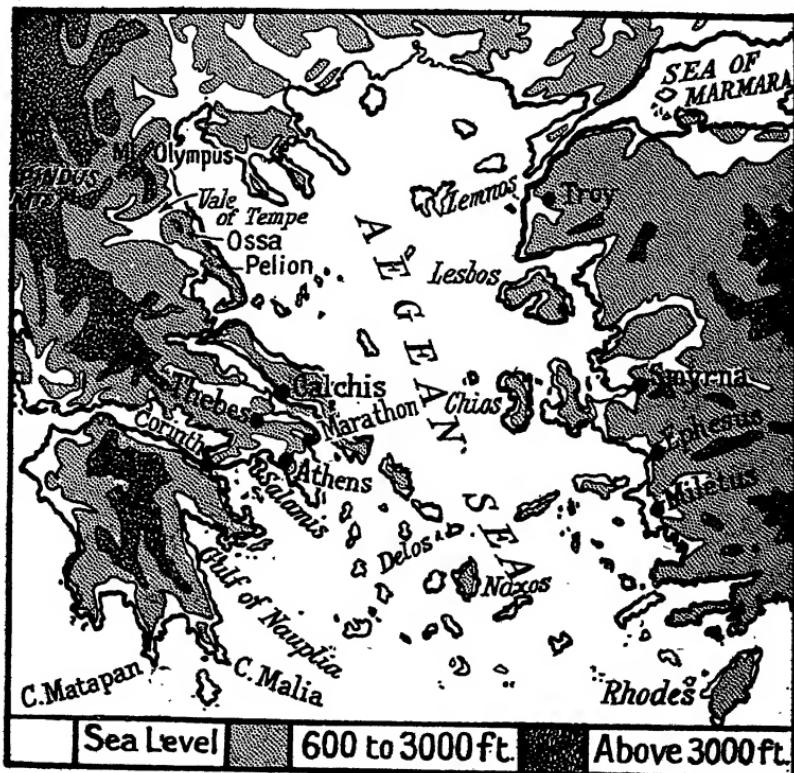


FIG. 206.—The Aegean Sea—the race home of the Hellenes.

(From Lyde's *Peninsular Europe*.)

embrace an area of 50,000 square miles and a population of six and a quarter millions (compare England 51,000; 38,000,000). Reference has already been made to the concentration of the population in more or less isolated coastal plains. The "outlook" of the Greeks

has always been towards the sea--the race home of the Hellenes. Of old was the coastal land of the Aegean Sea rather than the fringe of the peninsula. Pressure at home drove the Greeks to the sea for the conquest of lands overseas ; to-day pressure at home results in extensive emigration. The large merchant navy and carrying trade of the Greeks again reflects the geographical environment ; indeed, until 1916 there was no railway connection with any foreign country, so that foreign trade was essentially with the maritime countries of the world.

Greece really consists of three parts :

(a) The northern portion, stretching from the Adriatic Sea, across the Balkan Peninsula, and round the Aegean Sea. Along the Aegean Sea are the plains of Thessaly, Macedonia, and Thrace separated by mountain spurs.

(b) The southern portion, a peninsula with an isthmus so narrow that it has been cut across by a canal only four miles long (the Corinth Canal).

(c) The archipelago and the large island of Crete.

Greece is so mountainous that only one-fifth can be cultivated. Most of the mountains are dry limestone ridges, often nearly bare, but forests cover them where conditions are better, as on the west of the main hills. The climate is typically Mediterranean, but Greece suffers from a rather low rainfall. This makes cultivation difficult, for there is little water available for irrigation. Most of the cultivation is carried on, and most of the people live, on the small tracts of alluvium. Some of these tracts are marshy and unhealthy until scientifically drained. The principal grains are wheat, barley, and maize, but Greece is particularly famous for its fruits. The staple exports are tobacco and currants--the dried fruit of a vine with very small grapes. The greater part of the currants comes from the west coast around Patras. Of recent years production has been limited by law owing to world over-production. Olives are abundant ; nuts are grown in large quantity, and so are figs, oranges, and lemons. Tobacco is another big crop. Cotton can also be grown. There are many sheep in the northern regions, and wool is produced. Of the mineral deposits in Greece, those of iron, lead, and magnesite are most important. Greece is mainly an agricultural country, and the industries depend directly on the products of the soil. The principal industries are the preparation of olive oil, wine, cheese, leather, and soap.

The long and wonderful history of Greece is largely the result of its situation, almost between Europe and Asia near the ways which carried the traffic between those continents. Remains of ancient cities are scattered over the country and render it of great interest. The capital, *Athens*, has been a famous city for more than four thousand years. Its population has increased in the last few years from 300,000 to 700,000, owing to the settlement of

Greeks compulsorily emigrated from Asia Minor. One result is that Turkey carpet making is now an important industry. The long coast-line of Greece has numerous good harbours. A notable and inevitable port is *Salonika*, through which passes much of the trade of Yugoslavia, which country has now treaty rights to a certain area called the Serbian port. The ancient town of Athens has the modern port of *Piraeus* close by, which has a fine natural

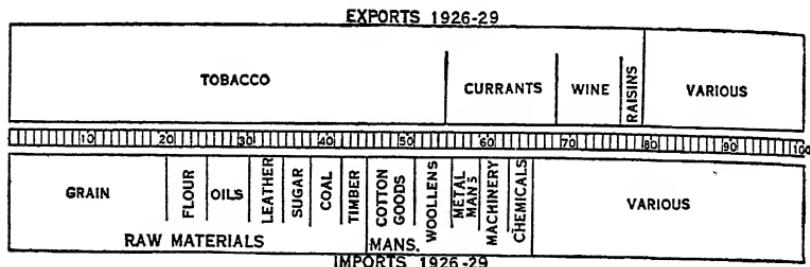


FIG. 207.—The trade of Greece.

harbour, and is the fourth port of the Mediterranean. *Patras* is the currant port. *Candia* is the principal town of Crete. The principal exports of Greece are tobacco and currants, other fruits, and olive oil—more than four-fifths of the total. The imports include grain, sugar, and other foodstuffs and manufactures. A large proportion of the trade is with the United Kingdom and the United States, Italy, and Germany.

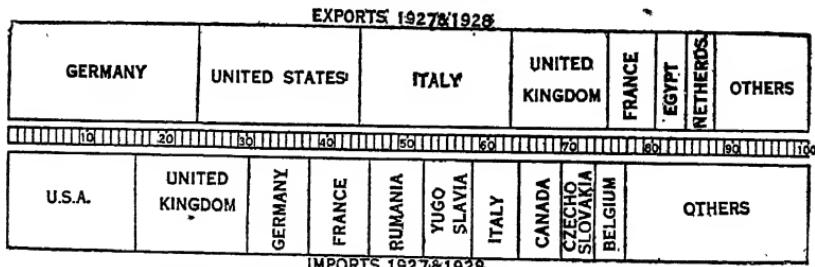


FIG. 208.—The direction of the foreign trade of Greece.

The important inland town of Adrianople, the natural centre of the lower part of the Maritza basin, was for a short time after the Great War placed under Greek dominion, but afterwards restored to Turkey.

ALBANIA

The principality of Albania is a rugged territory, about one-half larger than Wales, lying to the north-west of Greece and inhabited by a people quite distinct from the rest of the population of the peninsula, and who have nearly always maintained virtual

independence. In many ways Albania is the oldest part of Europe. There are natural harbours along the coast, but communication with the interior is the great difficulty (compare the Dalmatian coast of Yugoslavia). The country is now a kingdom under one of the old hereditary chieftains, and is in close alliance with Italy. The Italians have constructed a number of roads in the south, and are playing a leading part in opening up the country. But, broadly speaking, each Albanian family cultivates simply to supply its own needs, and most areas of the country remain uncultivated. The coastlands are the more fertile parts.

BULGARIA

The small and mountainous kingdom of Bulgaria, with an area of 40,000 square miles and a population of 6 millions, though bounded on the north by the Danube is more correctly considered a purely Balkan country than one of the "Danube lands." It falls into four parts :

- (a) The Danubian Foreland on the north ;
- (b) The Balkan Mountains ;
- (c) The Valley of the Maritza ;
- (d) The Rhodope Mountains.

The *northern* or *Danubian tracts* are mainly composed of irregular limestone tablelands cut by deep and narrow valleys. The surface has an arid appearance with no rich pastures nor forest tracts except in depressions. There are, however, the great cereal lands of Bulgaria where wheat, maize, sunflowers (grown for the oil which is expressed from the seeds), and, more recently, sugar-beet are the principal crops.

The *Balkan Mountains*, though containing fine forests of beech and oak (wherein pigs feed) and conifers, are full of clearings and rich in valleys surrounded by fields of barley, rye, buckwheat, and potatoes, as well as fine meadows. Sheep and goats are kept on the mountain pastures. In the south, in the upper valley of the Tunja, are the famous rose gardens of Kazanlik, which produce, or used to produce, the costly perfume known as attar, or otto, of roses. Vineyards and orchards are found on the lower slopes of the mountains, above the lower levels where cold, stagnant air favours frost.

The *Maritza basin* divides naturally into two parts; the west, around *Plovdiv*, where even rice and cotton are grown, as well as hemp and cereals; the east, more undulating, which is another great wheat land (in the hinterland of the port of *Burgas*).

The *Rhodope Mountains* of the south are mostly densely forested, but in the west, in the Struma valley region, the famous Macedonian tobacco is grown; and in the east, in the Aida valley, mulberry trees are grown and silkworms reared.

Four-fifths of the people of Bulgaria (mostly Bulgarians) live in the country ; two-thirds of the total population depend entirely on agriculture, but cultivation is primitive.

Sofia, the capital, is the largest town. Notice its important strategic position on the main—and only—railway route between western and central Europe and Asia Minor. *Philippopolis* (*Plovdiv*) is the centre of a rich agricultural region and an important junction on the Orient Express Route. *Ruschuk* is a river port on the Danube ; *Varna* and *Burgas* are the chief Black Sea ports.

Bulgaria exports tobacco, cereals (maize and wheat), and eggs, and imports cotton and woollen goods, machinery, and metals.

TURKEY

Position and Size.—The present-day republic of Turkey occupies a compact, roughly rectangular block of country, the whole of Asia Minor, in Asia, and a few dozen square miles only of European territory between Istanbul (Constantinople) and the Maritza River. The whole area is about 300,000 square miles, and the population 16,200,000, of whom 15,000,000 are in the Asiatic portion. Modern Turkey is entirely different in character from the old Turkish Empire. The empire included large numbers of Greeks, Syrians, Arabs, and other races differing in language, customs, and creed. The sultan was not only supreme ruler of the empire, but was also head of the Mahommedan religion. The modern Turkish republic, on the other hand, is essentially Turkish ; the Greeks and other nationalities have been expelled and the country divorced from the Mahommedan religion ; the Turks aim at building up a national state on modern European lines. Within a few years they have adopted European dress and the European alphabet (Roman)¹ and abolished many of their oriental customs.

Physical Features.—The whole of Asiatic Turkey, that is, Asia Minor, consists of a plateau and its marginal lands. Bounded on the north by the Black Sea, on the north-west by the Sea of Marmara, on the west by the Aegean, on the south by the Mediterranean and the Mesopotamian lowlands, the boundaries are well defined except on the east, where they pass through the tangled mass of mountains known as the Armenian Knot. The surface of the plateau has an average elevation of about 2,500 feet ; it has a slight tendency to slope towards the centre, where lies the large but shallow lake of Tüz Göl, and rises generally eastwards towards the Armenian Knot. On the north the plateau is bounded

¹ With the official adoption of the Roman alphabet, many place-names appear with new spellings. The capital is now Ankara, Constantinople becomes Istanbul, etc. Here the new spellings are used in the text, the older on the maps except Fig. 215.

by the Pontic mountains, consisting of a succession of ranges with a general east to west trend separated by deep valleys. From

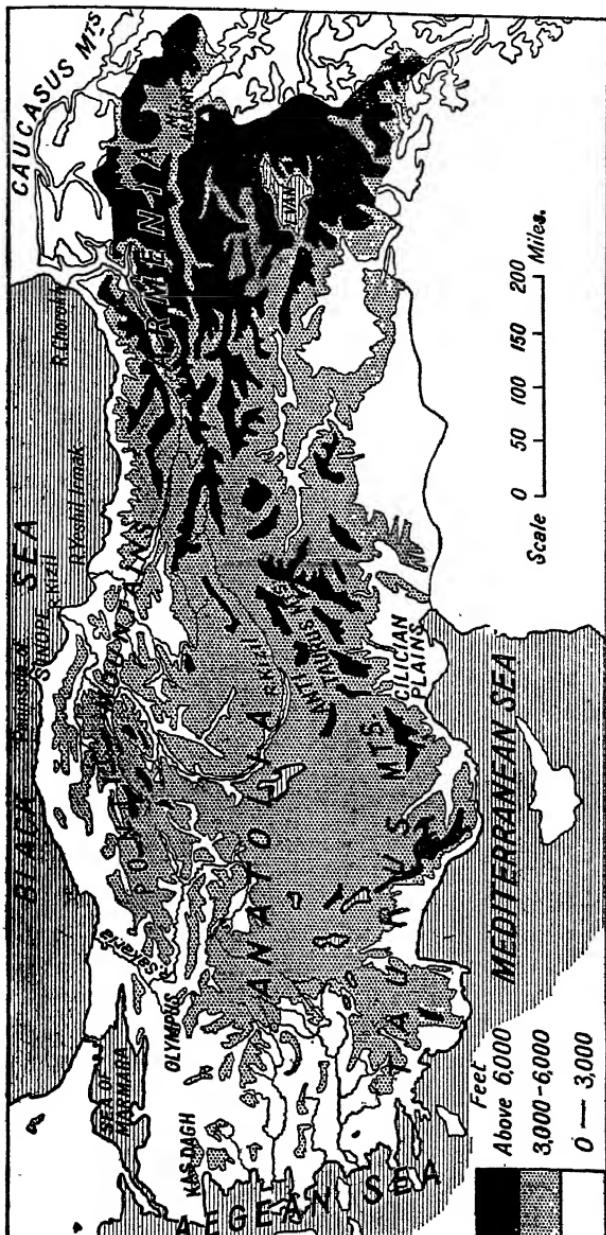


FIG. 200.—Turkey in Asia : physical.
(From Stamp's *Asia*, by permission of Methuen & Co., Ltd.)

the plateau towards the Black Sea one first climbs the innermost range and then descends by a series of deeply hollowed steps. The rivers of this region often have long courses parallel to the coast

before breaking through one of the ranges. These ranges are often short, and none runs the whole length of the plateau. On the south the plateau is bounded by the Taurus, again consisting of a succession of short ranges, but less complex than the Pontic and sometimes dropping sheer to the Mediterranean. Eastwards the Taurus is reinforced by the Anti-Taurus, and the whole series trends towards the north, joining up with the Pontic ranges to form the Armenian Knot.

On the west there is no definite rim to the plateau. Instead, the "grain" of the country is east and west; big spurs from the plateau project westwards and form mountainous promontories separated by deep, fertile valleys. These valleys are drained by rivers which include the Caicus, Hermus, Cayster, and Meander, and they constitute some of the most important land in Turkey.

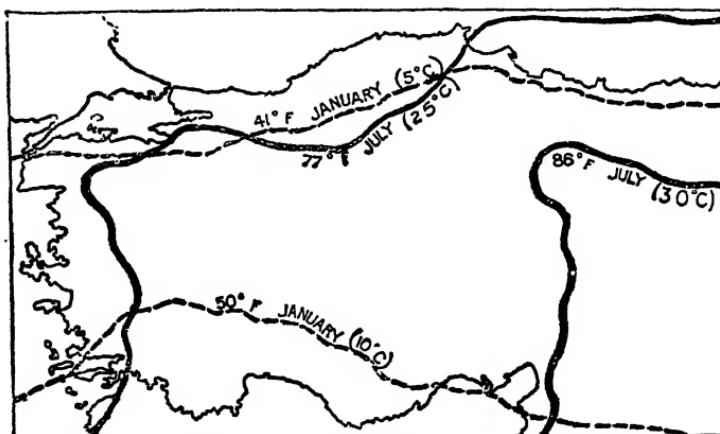


FIG. 210.—The climate of Turkey : January and July isotherms.

Climate.—Asia Minor comprises two climatic belts—the coastal tracts and the plateau. The *coastal tracts* have essentially a climate of the Eastern Mediterranean type. The greatest extremes are on the Cilician plains (50° in January to 84° in July); the Aegean valleys are between 40° and 50° in January but generally below 75° in July; along the northern coast the January temperatures are about or below 40°. The winds which sometimes sweep down the Mediterranean valleys from the plateau in winter are bitterly cold, and may be compared with the mistral from the Alps. The rainfall of the south and west coasts, almost entirely in winter, is about 20 or 30 inches, but the north-east coast has a very heavy fall, the winds picking up moisture from the Black Sea.

The climate of the *plateau* is like that on the steppes of Russia, but with a winter rainfall. Bitter winds sweep across the level plains throughout the winter and late into spring, whilst the summers

are scorchingly hot; over large areas where the rainfall does not exceed 10 inches semi-desert conditions prevail.

Vegetation.—The Mediterranean strips are clothed with the

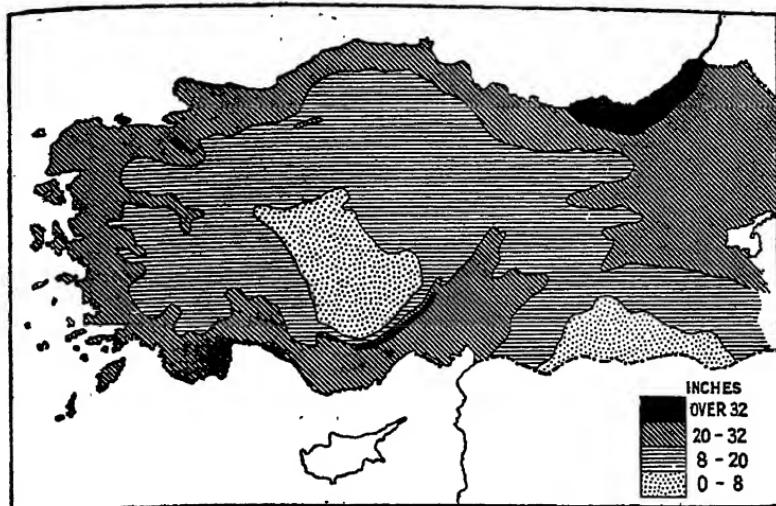


FIG. 211.—The rainfall of Turkey.

(After R. Fitzner.)

usual evergreen woodland, succeeded on the mountain slopes by deciduous and coniferous forest and by mountain pastures. Over vast areas the plateau is treeless except near watercourses, and the vegetation of grass and small shrubs is often very sparse.

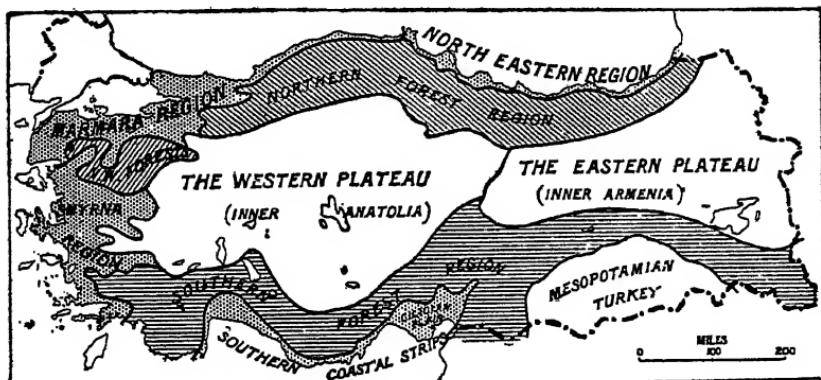


FIG. 212.—The natural regions of Turkey.

(From Stamp's *Asia*, by permission of Methuen & Co., Ltd.)

Natural Regions.—In dividing Turkey into natural regions there is first the clear-cut division into plateau and coastal tracts, whilst the usually forested mountains constitute a third primary

division. As shown in Fig. 212 these primary divisions may be subdivided.

(a) *Coastal Areas.*

1. *The North-Eastern Region*, as already explained, has a climate which is scarcely typically Mediterranean. The rainfall is heavy and there is no month wholly without rain. The olive tree—a tree so characteristic of Mediterranean lands as to be used as an "index" of Mediterranean conditions—will grow, but the olives yield little oil. The most important parts of this region are the

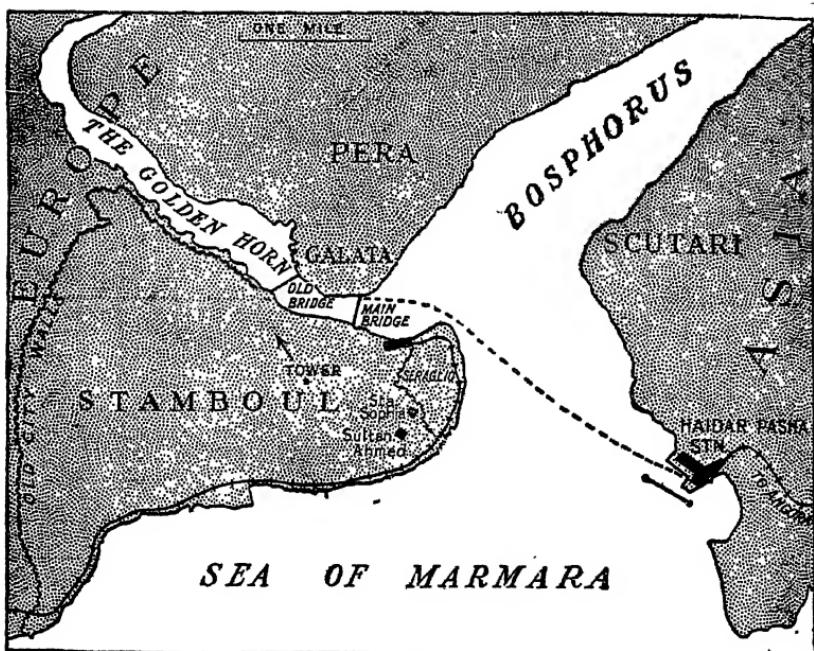


FIG. 213.—The position of Istanbul (Stamboul or Constantinople).

alluvial plains at the mouths of the Halys, Yeshil, and other rivers, where tobacco is a leading crop. Samsun is the chief centre of tobacco culture in Turkey. Trabzon (Trebizond) is the port of the eastern plateau.

2. *The Marmara Region*, including European Turkey, occupies the coastlands round the Sea of Marmara and includes broad, fertile valleys such as the Ismid Valley, Bursa-Plains, and Plains of Troy. With the Asiatic part of this area may be considered the narrow coastal strips which border the western half of the Black Sea. The valleys mentioned lie between lofty ridges which represent the western end of the Pentic mountains. The climate is Mediterranean, though the winters are cold and the January average only 40° or 41° . Tobacco is important and various Mediterranean crops

are grown, but this is, *par excellence*, the olive-growing region of Turkey. Olive oil in Mediterranean lands takes the place occupied by butter in more temperate latitudes, and large quantities are required. Despite, therefore, a huge production, Turkey has no surplus for export. The principal town of the region under consideration is Bursa, connected by a short railway and motor road with the port of Mudania on the Sea of Marmara. Chanak, on the remilitarized zone along the Dardanelles, is also in this region. Now that the bulk of Turkey is in Asia and the capital is at Ankara, Istanbul as the chief port is on the wrong side of the Bosphorus, and the Turks plan to construct a large port on the Asiatic side.



FIG. 214.—The west coast valleys of Turkey and the Smyrna hinterland.
(From Stamp's *Asia*, by permission of Methuen & Co., Ltd.)
(Land over 1,000 feet stippled.)

The naval station of Ismid is already here. Eregli (Heraclea) on the Black Sea coast is being made the port of Ankara, and a railway between Eregli and Ankara is under construction.

European Turkey now consists of the northern shorelands of the Sea of Marmara, some shorelands along the Black Sea, and a core of rolling plateau country (Eastern Thrace). The lowlands have a modified Eastern Mediterranean climate; the uplands of Thrace are treeless, open, grassy, rolling plains over which winds the railway from Adrianople to Istanbul. The country is here not unlike the Anatolian plateau of the centre, and similarly supports large numbers of sheep and goats.

The situation of the ancient walled city of Istanbul (as distinct from the suburbs of Galata and Pera on the northern shore of the Golden Horn) as guarding the Bosphorus and so the entry of the Black Sea and the southern outlets of Russia, is specially important. This importance must remain, despite the shifting of the Turkish capital to Angora.

3. *The West Coast, or Smyrna Region*, consists of the important fertile valleys already mentioned and the intervening ridges. The numerous islands off the coast which form extensions of the ridges are now part of Greece. Broad arms of the sea occupy the lower parts of the valleys and afford many sheltered harbours. The best of these, that of Smyrna, is situated near the head of an inlet into which no river brings sediment to cause silting up; on other inlets many of the ports of ancient times are now far inland. Though far from densely populated, the valleys of this region contain a large proportion of the total population of Turkey, and the region is famous for its output of dried fruits—especially the figs and sultanas exported from Smyrna. Another export crop is opium; whilst large areas are under wheat, barley, olives, and other crops for home consumption. The Mediterranean oak woodlands yield valonia, a name applied to the cups of the acorns of one of the oaks, from which a valued tanning material is obtained. Smyrna—a large part of which was destroyed by fire in 1922—is the great town and port of the region, and in addition to packing fruit for export, makes Turkey carpets. This part of Turkey was formerly much under Greek influence from ancient times, and there are many famous old towns, some of which now serve as collecting and distributing centres. Such are Bergama in the Caicus valley, Manisa in the Hermus valley, and Aidin in the Meander valley. Smyrna is now called Izmir.

4. *The South Coast Region*.—In many places along the Mediterranean the Taurus mountains rise almost sheer from the sea, and the coastal plain, if present at all, is but narrow. There is one area of some extent around Adalia, but by far the most important tract is that of the Cilician Plains. Here the climatic conditions are not unlike those of the Nile Delta—scorching hot in summer, mild and with only a low rainfall in winter. In this area cotton-growing is important, and there are modern cotton mills at Adana. The port of Adana is Mersina. Adalia is now Antalya.

(b) Plateau Areas.

1. *The Western Plateau, or Inner Anatolia*.—Economically the steppelands of Anatolia have less importance than the coastal regions just described, but they are the home of the Turkish race and form the heart of the modern republic. The whole region being one of low rainfall, generally less than 14 inches a year, it

cannot be described as naturally very productive. As usually the case in a country where the rainy season and the hot season do not coincide, rock weathering and formation of soil are slow processes. As a result the soils on the plateau are shallow, stony, and poor, and only in favoured tracts suitable for agriculture. Where the underlying rocks are impervious there are broad, unhealthy salt marshes. Elsewhere are numerous dry areas almost devoid of vegetation and sometimes covered with a white crust of alkaline salts which attract attention by their blinding glare in the summer sunshine. Stock-raising, carried on by nomads, is the chief occupation of the plateau. Cattle are reared where the somewhat richer pastures near a stream or lake provide fodder, and oxen are the principal animals used for ploughing in those regions where agriculture is possible. But the chief wealth of the region lies in sheep and goats. The sheep yield wool, mutton, and milk and form the chief source of meat for the whole country and of the wool used for clothing and for rug and carpet making. The goats are the long-haired Angora goats, producing the famous silky mohair. The hair is clipped off annually and exported via Istanbul, but the Turkish production has long been exceeded by that of South Africa. Mohair is largely used for the manufacture of hard-wearing materials such as plush. Amongst the favoured regions where agriculture is possible there is the Kayseri district and the south-western portion of the plateau near Konya. The latter area grows large quantities of wheat, and in addition to existing irrigation works there is a big scheme in hand for the utilization of water supplies from the nearby mountains of the Taurus. Amongst the towns of the plateau, the most important, of course, is Ankara, the present capital. The old town occupies an impregnable position on the top of a steep-sided hill, the new town being built round the foot. Its position with regard to the railway system of the country should be carefully noted. Other important centres on the plateau are Kayseri, Eskisehir, Konya, and Karaman. Angora is the old name of Ankara.

2. *The Eastern Plateau, or Inner Armenia.*—This plateau is very much cut up by numerous ranges of hills and thus differs from the more open western plateau where hills, though by no means absent, are widely separated by stretches of plain. The climate of the eastern half of the plateau is extremely severe, parts of the area being known as the Siberia of Turkey. The principal centre is the town of Erzurum.

(c) *The Forest Areas.*

1. *The Northern Forest Region* corresponds broadly with the Pontic ranges, already noted as consisting of ridges of hills parallel to the Black Sea coast and deep intervening valleys. Oak is

most important amongst the timbers, and although considerable quantities are extracted, large areas of the forest are still untouched. There are some important coalfields in this part which will be opened up by the new railway from Ankara to Eregli.

2. *The North-Western Forest Region* is a comparatively small tract largely surrounded by agricultural land, and from which there is a considerable export of valonia.

3. *The Southern Forest Region* corresponds roughly with the Taurus ranges, and it is economically the most important of the three areas. In the extreme west timber is extracted for shipbuilding, and exported from Istanbul and Izmir. The forests near the Cilician Plains furnish timber to the neighbouring lowlands. Farther east this region includes the rich mining districts around Arghana and also the important town of Diyarbekir. This part of



FIG. 215.—Existing and proposed railways in Turkey.

Turkey, it may be noticed, includes a certain area belonging geographically to the Mesopotamian lowlands.

Communications.—Modern Turkey is a vast country and the only way of developing its resources is by improving communications, especially the railways, of which there are about 4,000 miles at present in operation. A map has therefore been included showing the existing railways and those under construction. This should be carefully studied with reference to the natural regions and the tracts specially mentioned as capable of development. As already observed, however, Turkey is only thinly populated, and the population is not a rich one. The map of communications shows that the new capital of Ankara is centrally situated and fairly accessible from all parts of the country, especially when the new ports shall have been opened. The leading port at present is, of course, Izmir, if one excludes Istanbul in European Turkey,

but from what has been said it is evident that Turkey intends to make Eregli, Samsun, and Trabzon the great ports of the north, Antalya and Mersin the ports of the south.

Foreign Trade.—The exports of Turkey at the present time are valued at about £20,000,000, the three leading items being tobacco, fruit, and wool, including under the last the woollen carpets which one associates especially with the country. Amongst the imports cotton goods and metals take leading places, but 10 per cent. of the total consists of cereals, indicating a rather unsatisfactory state of affairs when such a large and predominantly agricultural country should need to import foodstuffs. It may be explained that although only a small quantity is grown in the country, rice forms a staple food-grain of the Turks.

CYPRUS

The island of Cyprus was conceded by the Turks to Britain as long ago as 1878, but it has remained a comparatively little-known portion of the British Empire. It has an area of 3,584 square miles and a population of about one-third of a million consisting

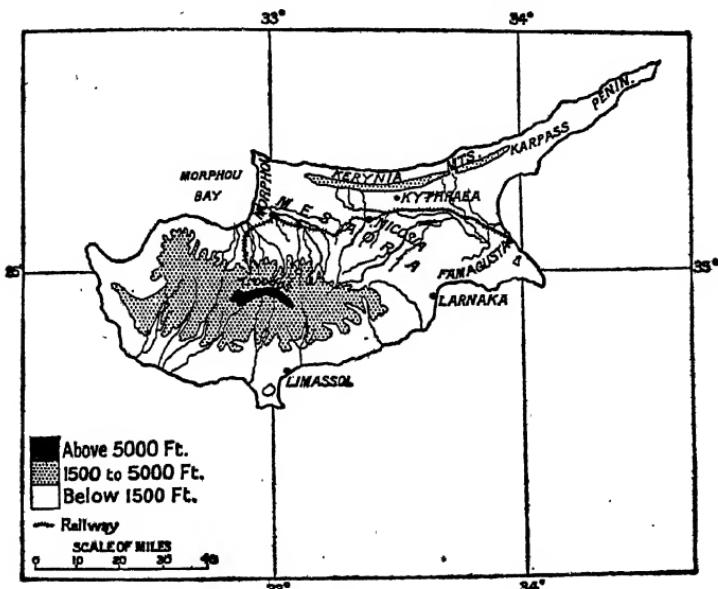


FIG. 216.—Cyprus.

mainly of Greek and Turkish descendants. The island can be divided into three physical units: the northern range of hills, the central stretch of plains, and the southern mass of mountains. The winter is cold, the summer scorchingly hot; the rainfall on the whole is low. Economically the most important part is the

central plain which, owing to its sheltered position, is a very arid tract except where irrigated. In spring the whole of Cyprus is delightful, and the harvest of barley and wheat is early, whilst a rich profusion of fruits is produced later in the year. There is no doubt that Cyprus is capable of much greater development, that it has enormous importance from the point of view of its strategic position, and deserves to be better known. The principal towns are shown in the accompanying map.

ARAB ASIA

Introductory.—Over nearly the whole of South-Western Asia south of the mountain belt of Persia and Turkey, the Arab race and the Arabic language are predominant, and hence the convenience

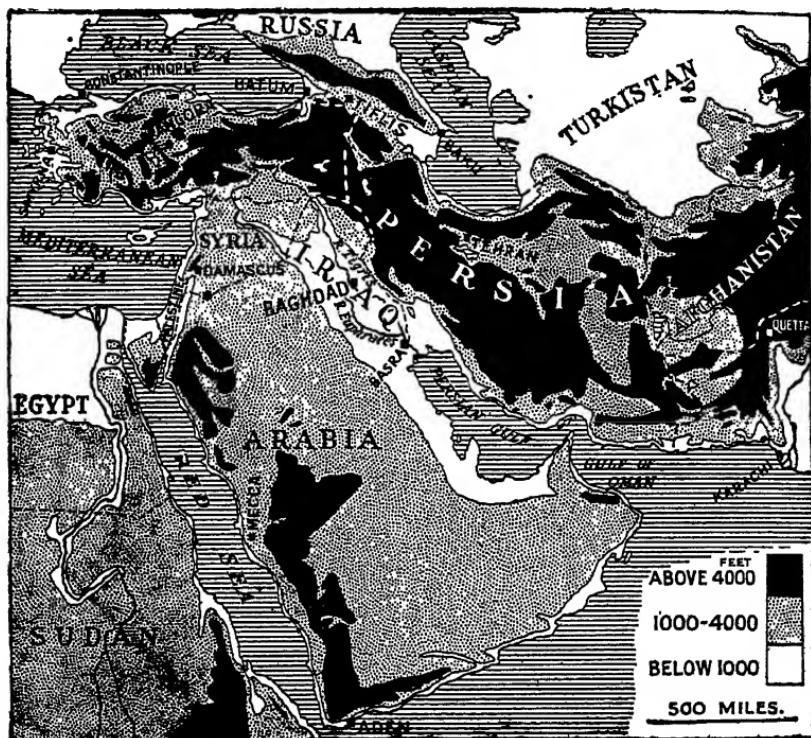


FIG. 217.—South-Western Asia.

of the name "Arab Asia" to include the whole of this tract. It is now divided between the French mandated territory of Syria, the British mandated territory of Palestine and Transjordan, the kingdom of Iraq, the Arab kingdoms of Arabia proper, and the British sphere of influence extending from Aden.

Physical Features.—Well defined on the north by a moun-

tainous rim, Arab Asia is demarcated on all other sides by the sea, except along the narrow isthmus of Suez which separates it from Africa. The dominant feature of the whole area is the great plateau of Arabia, with its high south-western edge overlooking the Red Sea and its long, gentle slope north-eastwards to the plains of Mesopotamia. In the east the plateau merges into the fold-mountain country of Oman, the ranges of which are connected with the Persian system on the other side of the Persian Gulf. In the west along the Mediterranean Sea are the north to south mountain and valley systems of Syria and Palestine, including that famous trench, the Jordan Rift Valley. Geologically the whole area, with the exception of the fold ranges of Oman, consists of an ancient block of metamorphic rocks, and is thus comparable with the Russian platform. The ancient rocks, however, are hidden over large areas by later deposits, by great spreads of almost horizontal limestones in Palestine and Syria and by vast tracts of alluvium in Mesopotamia (compare the alluvium of the Ganges Plain). Along the high south-western edge of the plateau, and, indeed, over many other parts of it, there are huge spreads of lava, much of which is of comparatively recent age.

Climate.—The Tropic of Cancer passes through the heart of Arabia and across the centre of the Red Sea, so that Arabia is essentially in the Extra-Tropical High Pressure Belt of the Sahara. In the extreme south the mountains are slightly influenced by the monsoons of the Indian Ocean; on the other hand, the parallel of 34° N., which passes through the centre of the eastern Mediterranean, passes slightly to the north of Beirut, Damascus, and Baghdad, so that this tract (*i.e.* Syria and northern Mesopotamia) lies in the continuation of the Mediterranean belt. The cyclones which bring the rainfall to Mediterranean lands give Syria and Palestine a characteristic winter rainfall and then work their way, with decreasing intensity it is true, along the lowlands of Syria south of the great belt of mountains, and so into the Mesopotamian plains. The rainfall from these cyclones gives rise to the famous "fertile crescent" connecting northern Syria and Mesopotamia. Reference will be made later to the great importance of this particular tract.

Vegetation.—The natural vegetation of most of South-Western Asia is the Evergreen Mediterranean Woodland, passing gradually into scrub and desert as the rainfall decreases. As will be described in detail under Palestine, elevation results in great differences in natural vegetation and cultivated crops. Arabia is often popularly regarded as if it were one vast desert. Actually it consists of what may be called, for want of a better name, dry steppelands (though they are not necessarily dry grasslands), surrounded by a ring of true desert country. Amongst the arid

steppelands are numerous large and important oases capable of supporting a large settled population.

Population.—The Arabs are the natives of Arabia and are organized in small tribes ruled by a chief sheik. They fall readily into two classes, settled tribes and the nomadic tribes who are otherwise known as Bedouins. On the borders of the tract under consideration, that is to say in Palestine, Syria, and Mesopotamia, the Arabs have come very markedly under the influence of surrounding nations. The main lines of communication in the past between Europe or Africa and Central and Eastern Asia have passed through South-Western Asia, so that the population bears the impression of contact with such varied nations as the Egyptians, Greeks, Romans, Turks, French, and British. The settled population of these borders, therefore, though largely

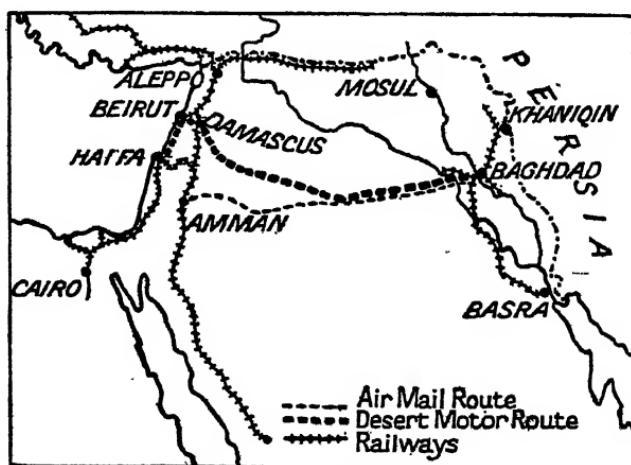


FIG. 218.—The desert routes of South-western Asia.

(From Stamp's *Asia*, by permission of Methuen & Co., Ltd.)

of Arab stock, is more conveniently called Syrian. The Jews of Palestine will be considered later.

Communications.—Before leaving Arab Asia as a whole reference must be made to the importance of the area from the point of view of international communications. If we exclude the northern routes through Russia, the possible lines of communication between Europe or Egypt and India or the Far East which were available to the ancients are not numerous. The passage through the complex of mountains of Armenia was extremely difficult, leaving two groups of routes :

(a) *The Red Sea Routes.*—The ancients utilized these routes by going up the Nile Valley to Thebes, crossing the desert to a port on the Red Sea, and thence by sea to India. The present-day route has been developed into the Suez Canal route, which, it will

be noticed, is controlled by the nation which commands Suez on the one hand (Egypt) and the nation commanding the entrance to the Red Sea on the other. Here Great Britain holds Perim Island in the Straits of Bab-el-Mandeb (and also the Aden coast), France the opposite coast of Africa (French Somaliland).

(b) *The Persian Gulf Routes.*—Because of the mountains on the north and the desert on the south these routes from the Mediterranean to the Persian Gulf had of necessity to pass along that fertile tract to which we have already referred, known as the Syrian saddle or the fertile crescent. In recent times the bold bid of Germany to gain control of this ancient route by building the Baghdad railway emphasizes the controlling influence which geography may still exercise. The actual Baghdad railway, it should be noticed, starts from Konia on the Anatolian plateau, and threads its way by a series of tunnels through the Taurus range near the famous pass known as the Cilician Gates, to the Syrian town of Aleppo. From Aleppo it reaches as far as Nisibin, about 150 miles from the Mesopotamian railhead. Of very special interest in connection with land routes is the modern motor road across the desert between Beirut and Damascus in Syria and Baghdad in Mesopotamia. From Damascus to Baghdad is 513 miles right across the desert, but with modern motor coaches, specially constructed, the journey can be performed in less than 24 hours, a speed of over 40 miles an hour in some stretches being regularly maintained by the motors of the mail service. Comparing this with the average rate of bullock-cart travel in India or the Far East, which is 15 miles per day, it would take 30 days of continuous travel to cover the equivalent distance, obviously impossible across such desert country.

PALESTINE

Position and Area.—The British mandated territory of Palestine has an area of about 9,000 square miles—rather larger than Wales—and a population of about a million. The present boundaries of the country correspond closely with the historic boundaries of the promised land of the Jews, and were so framed after the capture of the country from the Turks in 1917-18 as to include all the new Jewish colonies. On the other or eastern side of the Jordan the mandated territory of Transjordania is under the same administration, but is not part of the territory set aside as a national home for the Jews.

Physical Features and Climate.—Palestine consists of three parallel strips:

(i) *The Coastal Plain* which lies along the Mediterranean and is broad in the south but narrows northwards where Mount Carmel

almost reaches the coast. The climate is typically Mediterranean with a comparatively small range of temperature, frost and snow being unknown in winter and the average August temperatures not exceeding 80°. The rainfall increases steadily from south to north. Climatically favoured, the maritime plain has also a light fertile soil, and the whole area is proverbially fertile. Much, however, is uncultivated at present, and there are large areas

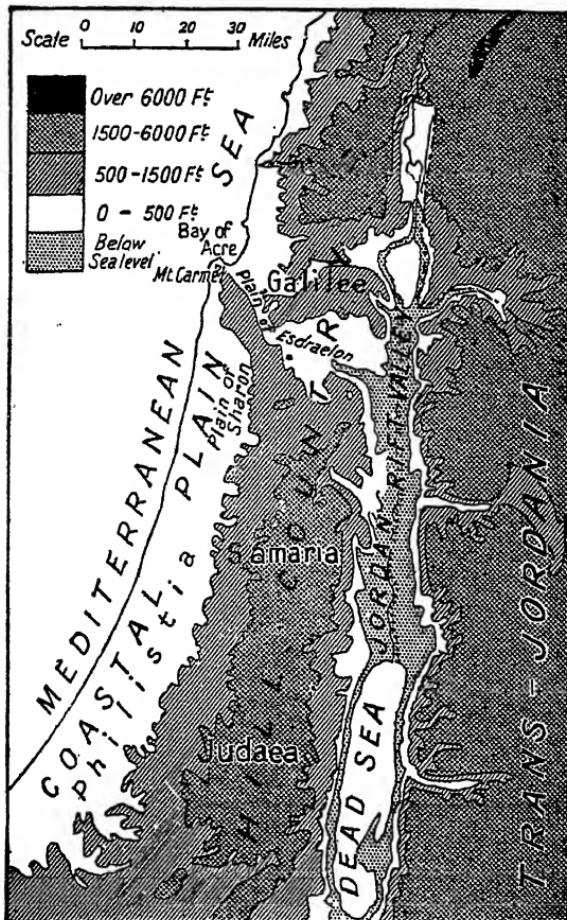


FIG. 219.—Palestine: natural regions.

available for Jewish settlement. Around Jaffa are the famous orange groves; further north are cornfields and vegetable gardens. Bananas also grow well in this region.

(ii) *The Hill Country*, also called West Jordan Land, forms a strip lying between the coastal plain on the west and the Jordan Rift Valley on the east, and about 25 to 40 miles in width. It is divided into two separate blocks by the broad, fertile plain of

Esdraelon, the block to the north known as Galilee, the high block to the south including Samaria and Judæa. The whole country is built up of a succession of hard impervious limestones and softer chalky limestones, the beds being approximately horizontal. Where the hard limestone prevails the hills are barren and stony, the innumerable valleys narrow and dry, whereas the chalky limestones give rise to more fertile country ; the very best country, however, is that in the north, where the rainfall is heavier and where lava flows have disintegrated to a rich soil. The climate is more severe than that of the coastal strip, January average temperatures being as low as 45° , frost being usual and snow not uncommon. The natural vegetation is a rough scrub, whilst amongst cultivated plants olive groves are especially important in Samaria and corn crops in Galilee, but very large areas are uncultivated and tenanted only by a few sheep or goats. This is especially the case in the south, where the rainfall is very low. Jerusalem lies in the heart of the whole belt of Judæa about 3,000 feet above sea-level, whilst Nazareth occupies an almost corresponding position in Galilee.

(iii) *The Jordan Rift Valley* is a long, straight valley with very steep, almost precipitous sides and averaging 10 to 15 miles in width. It is drained by the Jordan, which rises in the north, flows through the Sea of Galilee, and then for 70 miles pursues its course before emptying into the Dead Sea, the surface of which is 1,292 feet below sea-level. As on the coastal belt, temperatures are much higher but are here more extreme ; Jericho, for example, ranges from 54° in January to 89° in August. Frost and snow are entirely unknown. Much of the Jordan Valley is sheltered from rain-bearing winds and forms a very dry, almost desert tract. Considerable areas can be (and probably will be in the near future) irrigated from the Jordan, though in the south the soil is too impregnated with salt. Where the rain-bearing winds from the Mediterranean can penetrate, as they do south of and around the Sea of Galilee, the tract is a fertile agricultural one. The crops



FIG. 220.—Jewish land in Palestine.

(From Stamp's *Asia*, by permission of Methuen & Co., Ltd.)

(Notice its concentration in the Plain of Esdrælon and along the coastal strip.)

possible are those mentioned in connection with the coastal plain, and therefore contrast with those of the hill belt, where such warmth-loving plants as bananas will not grow.

Population.—The population of Palestine consists very broadly of two-thirds Syrian Moslems, one-twelfth Christians, mainly Syrians, and one-quarter Jews. The almost insoluble problems of the country are bound up with the racial and religious differences of this population. Palestine is the promised land and the ancestral home

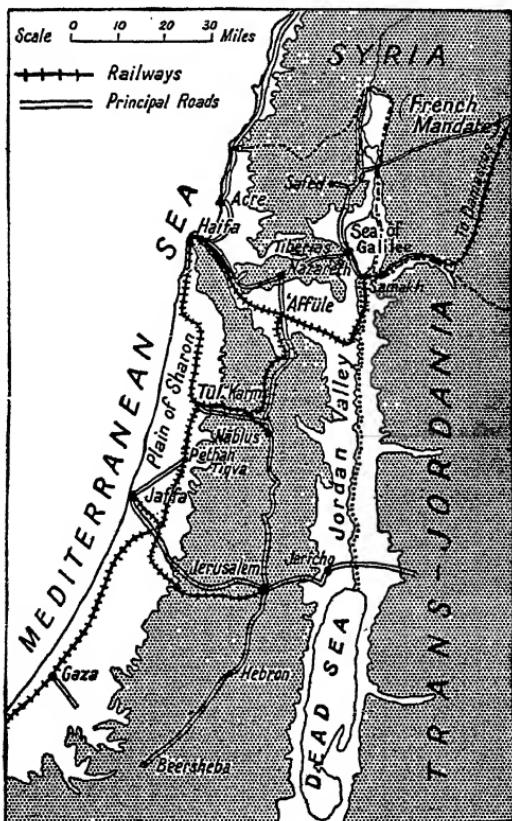


FIG. 221.—Palestine : communications by rail and road.

of the Jews. It is also the birthplace of Christianity, and contains the spots most sacred to Christians ; but Jerusalem, after Mecca, is the holiest of Mahomedan cities, and was in Moslem hands continuously for seven centuries until 1917. Fortunately, the country is far from overpopulated, and it is estimated that one-third of the whole area is available for purchase and settlement. Hence making Palestine the national home of the Jews does not require evacuation by any existing inhabitants. There are over 130 Jewish agricultural settlements in Palestine, the immigrants coming mainly from the countries of eastern Europe. It is only

fair to state that these Jewish cultivators have been very active, and have in particular drained and rendered fertile the once malarial and unhealthy stretch of the Plain of Esdraelon. In addition the considerable town of Tel-Aviv adjoining Jaffa is a monument to Jewish enterprise : a thriving city now stands where a few years ago was a waste of sand dunes.

Communications and Trade.—Palestine has a good system of metalled roads which are the natural descendants of tracks made in those days when the hill roads were safer than the valleys, and hence the existing roads are badly placed from the point of view of modern transport. To give an example of this : from the principal port of Jaffa to the plateau of Transjordania is about 75 miles, but the road climbs 3,000 feet to Jerusalem, then drops 4,300 feet to the Jordan, and then climbs again 4,000 feet to Amman. A road from the port of Haifa would avoid all hills except the final one. Haifa, the natural outlet of the whole country and an important railway junction, has become the chief port and the chief manufacturing town ; a fine harbour was completed in 1933. This development of Haifa has been hastened by the oil pipe-line from Iraq which terminates there (with another branch to Tripoli in Syria) and was completed in 1934-35.

The exports of Palestine in recent years have been worth about £2,500,000. By far the most important exports are oranges ; other items include soap made from olive oil, water melons, wine, and almonds. It should be noted that the imports, which include numerous foodstuffs, are about five times as valuable as the exports. This is despite the fact that Palestine is predominantly agricultural and can grow much larger quantities of wheat and barley and millets than it at present produces. Palestine is poor in minerals, but the Dead Sea salts are now being utilized. An important hydro-electric station on the Jordan has recently been completed.

Transjordania occupies a considerable tract of the plateau on the east side of the Jordan Rift Valley, and is an agricultural and pastoral land merging into desert.

SYRIA

Position and Area.—The country now officially known as Syria is under French mandate until 1939, and lies between Turkey on the north, Palestine on the south, and between the Mediterranean Sea on the west and the Syrian desert on the east. It has a total area of about 60,000 square miles and a population of about 3,000,000, three-quarters of whom are Mahomedans.¹

Physical Features.—The same four belts as in Palestine and Transjordania may be distinguished, but they are not so clearly marked.

¹ In 1938, following agreement between France and Turkey, the "Sanjak" of Alexandretta (the territory round the port) became independent, Turkey to have the use of the port.

i. *The Coastal Plains*, which are narrower and in many areas can scarcely be separated. Where the narrow coastal plain locally broadens out one usually finds a town of some importance. Examples are Alexandretta, Tripoli, and Beirut. Like the Palestinian plains those of Syria (including Phœnicia) are fertile and valuable. Tripoli has world-famous orange groves, and has recently been made the terminus of the northern branch of the Iraq oil pipe-line, Beirut huge olive groves, whilst the plain of Latakia is famed for tobacco.

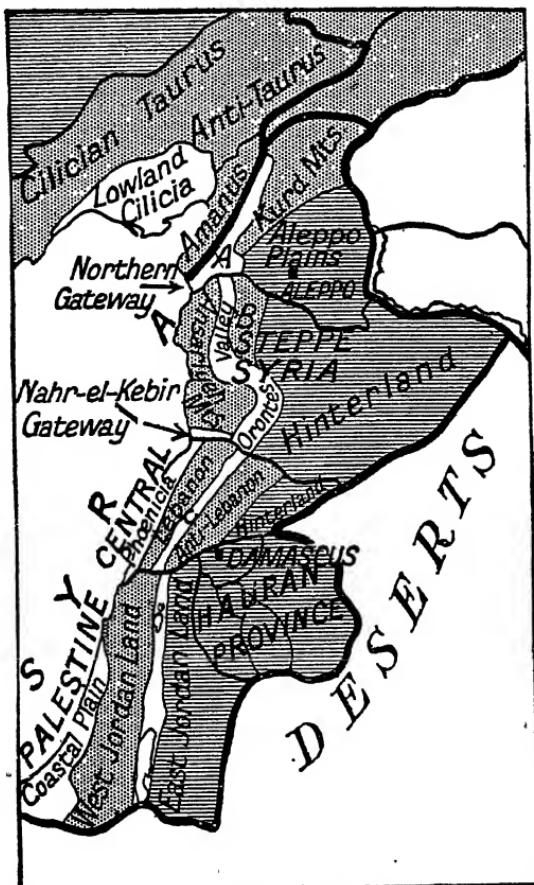


FIG. 222.—Syria : natural regions according to Banse.

ii. *The Western Hill Belt* consists in Syria of a succession of mountain or hill ranges divided into three blocks by the gorges of the lower Orontes and the Homs-Tripoli Pass. The northern block is known as the Amanus Range, the central as the Ansariyah Mountains, and the southern as the famous Lebanon. Much of the hill country is wild, and inhabited by Mahomedans famed for their religious and general intolerance and who form almost

independent political units. Here the mountains are of limestone and the inhabitants live mainly in villages in the valleys. Few trees now remain to remind one of the once famous cedars of Lebanon, except where they have been preserved in sacred groves.

iii. *The Great Central Depression* corresponding to the Jordan Valley is not nearly so well marked as in Palestine, nor does it sink below sea-level. In the north it is formed by the fertile plain of Antioch (marked A on Fig. 222), where mulberry trees are cultivated and the production of silk is important, and various cereal crops are grown. An interesting product of this region is liquorice root, found growing wild near marshes and river banks. Further south the depression is occupied by the middle course of the Orontes and is a marshy and unhealthy tract. The upper course of the Orontes (marked C on Fig. 222), on the other hand, lies in a delightful, fertile valley about 10 miles wide, where are the prosperous little towns of Homs and Hama, and where there is a wide spread of cultivated fields and fruit trees.

iv. *The Eastern Mountain Ranges* do not form a continuous series; sometimes they are merely the edge of the eastern plateau (the eastern plateau is called "hinterland" on Fig. 222), but at other times rise to great heights, as they do in the range known as Anti-Lebanon and Mount Hermon. Another group of mountains is marked B on Fig. 222. Where the range is low, moisture-bearing winds from the Mediterranean penetrate to the plateau, hence the cultivated fields and the broad tracts of grazing land in the north around Aleppo and in the south (Hauran Province of Fig. 222) near the borders of Transjordania. Where, on the other hand, the mountains are high, they effectively cut off the rain-bearing winds and the desert stretches right up to their lower slopes. This is the case near the famous city of Damascus, whose fertility is due to irrigation from the Barada River. Sooner or later, however, the eastern plateau passes into the Syrian desert.

Communications and Development.—The railway system of Syria suffers from a mixture of gauges. There is a broad-gauge railway from Aleppo to the port of Tripoli, but that from Damascus to Beirut is only narrow gauge (Fig. 223), with the result that road transport is now important. The great towns of the interior are Aleppo, the wonderful market centre in the north and the starting point for the Syrian saddle routes to Mesopotamia, and Damascus in the south. Beirut is the great port, with lesser rivals in Tripoli and Alexandretta. Syria is essentially an agricultural country. Wheat, barley, maize, and olives are the leading crops, whilst in recent years cotton cultivation has been widely extended, and the silk-rearing industry is an old and important one. Sheep and goats are also numerous. Syria is, however, poor in minerals. As in Palestine, there is an unfavourable balance of trade; cotton

wool, silk, and fruits are the chief exports, but it is important to notice that there is still a considerable import of cereals.

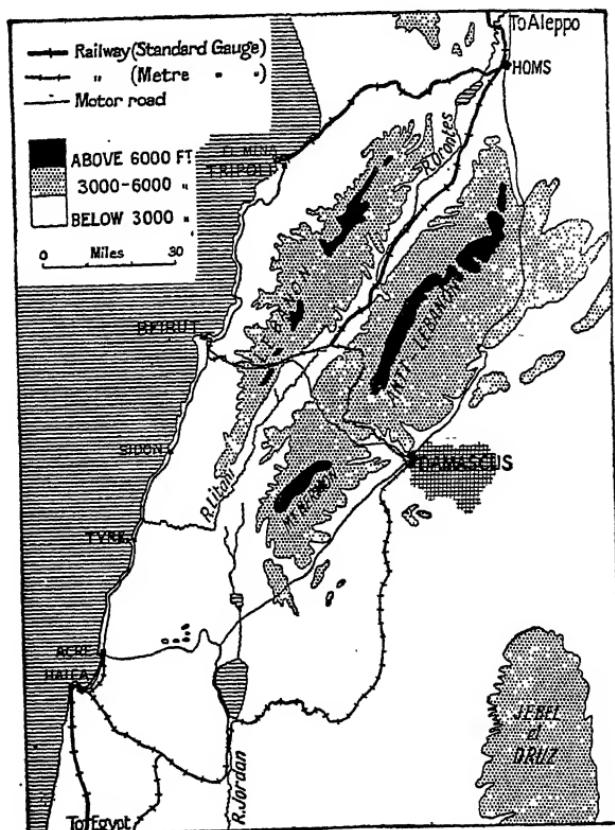


FIG. 223.—The position of Damascus.
(The cross-hatched area is the irrigated land.)

THE AFRICAN COAST OF THE MEDITERRANEAN¹

That part of the continent of Africa which abuts on the Mediterranean Sea falls at once into two parts which are distinct physiographically, structurally, and climatically.

(1) The eastern half lies between latitudes 30° and 33° N., and here the real Africa, the continent of plateaus, reaches the coast. Vast stretches of almost unfolded Secondary and Tertiary sediments obscure the underlying platform of ancient rocks. Here, too, the greatest desert in the world reaches the very shores of the Mediterranean, for the Atlas lands act as a shield from the rain-bearing westerlies even in winter. No part has 20 inches of rainfall per year (Alexandria 8 inches; Tripoli 16 inches). Politically the eastern third of the coast-line lies in the kingdom of Egypt; the western two-thirds in the Italian territory of Libya (including Cyrenaica

¹ For a fuller treatment, see Part II of this series.

and Tripolitania). The normal character of the coast-line in Egypt is interrupted by the great delta of the Nile.

(2) The western half lies almost entirely north of latitude 35°. It is occupied by the great complex chain of the Atlas Mountains,

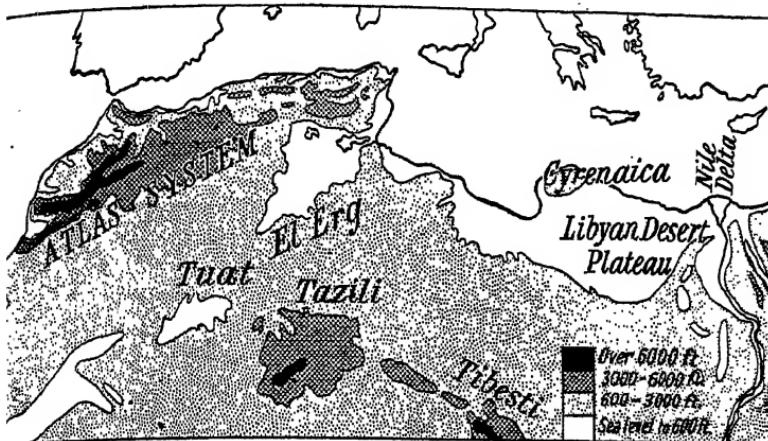


FIG. 224.—North Africa—physical.

and these Atlas lands are structurally more closely allied to Europe—of whose Alpine Folds the Atlas are part—than to Africa. Moreover, the climate is essentially Mediterranean and large tracts are well watered. Once the heart of the Great Moorish Empire, with the

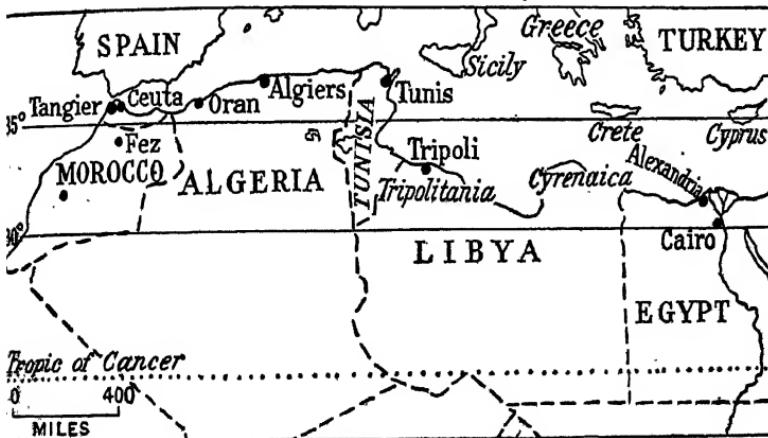


FIG. 225.—North Africa—political.

exception of the small Spanish sphere of influence in Morocco and the international zone round Tangier, the whole area now comes within the French sphere of influence. The contrast between the value and fertility of the French sphere of influence in North Africa and the valuelessness and infertility of the Italian will be referred to later.

EGYPT

Most of the independent kingdom of Egypt is a desert. The total area is 383,000 square miles—more than three times the whole of the British Isles—but the settled and cultivable area (the Nile Valley, Delta, and Oases) covers only about 13,600 square miles, or a little over a quarter the area of England.

The Nile Valley is a flat-bottomed valley, about 10 miles wide and bounded by cliffs on either side. The character of the cliff-like boundaries of the valley is important, because it prevents any lateral

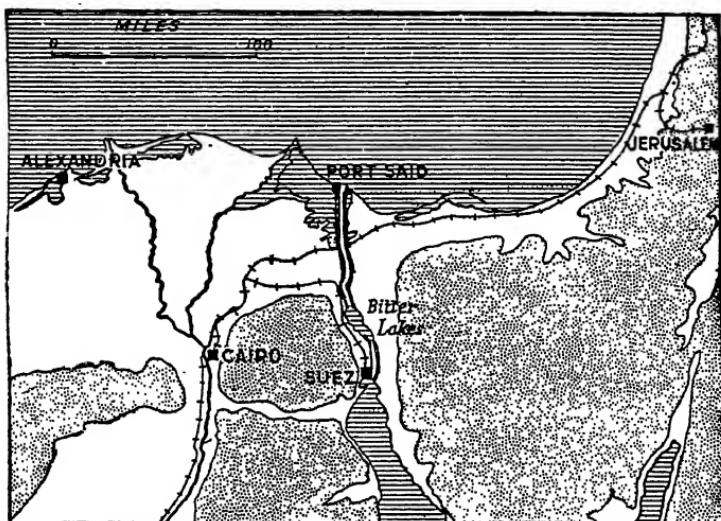


FIG. 226.—The Suez Canal.

Notice that there is no high land near, and so there are no locks on the canal. The highest land passed through is only 50 feet above sea-level.

extension of the irrigated areas. The Nile Valley in Egypt has over 1,000 people to the square mile.

Fertile Egypt falls into two parts:

- (a) The Nile Valley, or Upper Egypt.
- (b) The Nile Delta, or Lower Egypt.

Upper Egypt.—In the old days Upper Egypt used to be made fertile by the annual floods of the Nile, which spread a layer of fine silt as well as water over the land. It should be noted that the Nile of Egypt is formed by the junction, in the Anglo-Egyptian Sudan, of the White Nile and Blue Nile. The White Nile rises near the Equator and is an almost constant stream; the Blue Nile rises amongst the mountains of Abyssinia and after the summer monsoon rains and melting of the snow there, comes down in flood at the end of the summer in August or September. The valley of the Nile in Egypt was divided up into a number of compartments rather like rice-

fields with high banks. This prevented the water flowing quickly, and was called basin irrigation. Now the valley is largely irrigated by canals from the great dam at Aswan and other storage works (barrages at Esna, Asyut and Zifta).

Lower Egypt, or the Nile Delta, is also watered by canals. But here a considerable amount of marsh land waits to be reclaimed.

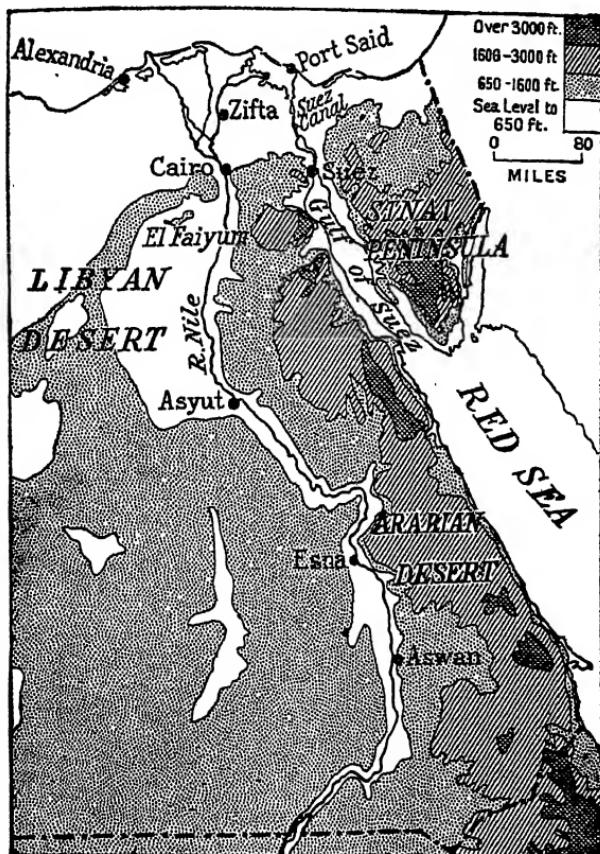


FIG. 227.—Egypt.

The delta is on the borders of the Mediterranean and gets a little rain in winter.

The great cash or export crop of Egypt is cotton (which occupies a larger area than any other crop), mainly the excellent Sakellaridis variety. The great food crops are maize, wheat, barley, and beans. A little sugar cane and rice are grown.

Desert Egypt falls into two parts—the Libyan Desert on the west and the Arabian Desert on the east. Amongst the famous oases of the former that of El Faiyum occupies a hollow below

sea-level. Apart from the dates of the oases, phosphate is mined in some areas and oil obtained from oil-fields on the shores of the Gulf of Suez.

Cairo is the capital and largest town in Egypt. It is situated at the head of the delta, on the borders of Upper and Lower Egypt, and so was a convenient centre from which to govern the whole of the long, narrow country. The tourist traffic is an important national asset to Egypt.

Alexandria is the principal port, but it suffers from mud filling up the channels. Raw cotton forms nearly nine-tenths of the exports of Egypt; cotton seeds are also exported. Egypt cannot grow enough food for her big population, and imports food-stuffs as well as coal, wood, cotton goods, and iron and steel manufactures. Although cotton is almost the only export of Egypt, the value of cotton exported is less than that exported by India. Notice carefully the communications of Egypt, especially the way in which the railways have been built where the river cannot be used.

The *Suez Canal* lies in Egyptian territory. It cuts through a flat strip of desert, the isthmus between Egypt and Sinai. The canal is roughly 100 miles long, but part of that distance is through the Bitter Lakes. At the northern end is Port Said, on the Mediterranean; at the southern end is Suez, on the Gulf of Suez. The canal was built by the French engineer De Lesseps, and finished in 1869. It has since been enlarged, but still limits the size of vessels trading between Europe and the East. There are no locks, and the canal is open to the sea at both ends. The Suez Canal is owned by the Suez Canal Company, in which the British Government has some shares, other shares being held by the French. Nearly 5,000 steamers pass through the canal in a year; more than half of them are British.

LIBYA

Libia Italiana is divided for administrative and military purposes into two districts, Tripolitania and Cyrenaica, with capitals respectively at Tripoli and Bengazi. Italy annexed Libya from Turkey in 1911-1912. The boundaries have since been extended slightly east and west, and effective occupation extended further south in 1928. Tripolitania has an area of roughly 300,000 square miles, Cyrenaica about the same. But less than a million people live in this vast area—a mixed population of Arabs, Negroes, and Jews. Libya is Italy's chief colonial possession, yet it is doubtful whether more than a million Italians could find land suitable for settlement (there were in 1931 less than 45,000).

Therein lies the great rivalry between France and Italy. For France, the larger and richer, has a population of 41,000,000 almost

stationary; Italy has a similar population rapidly increasing. France has a vast colonial empire with room for settlement and development; Italy owns only huge tracts of desert of little value for settlement. It is true that opinions differ regarding the possibilities of Libya: Cyrenaica is said to have pastures suitable for cattle and land suitable for bananas, wine grapes, barley, and dates. Tripolitania, in particular, can be divided into three belts:

- (1) The Mediterranean, further divisible into :
 - (a) The coastal oases, in which thrive the date palm, olive, orange, and other Mediterranean plants;
 - (b) The steppe belt, said to be suitable for cereals and pasture;
 - (c) The dunes, which are being afforested with acacia, poplar, etc.
 - (d) The mountains, on the slopes of which fruit trees will grow.
- (2) The sub-desert, growing the alfa plant, suitable for cellulose (artificial silk) making.
- (3) The desert includes some fertile oases, and there is still a large caravan trade across the Sahara to the Central Sudan. Along the coasts of Libya sponge and tunny fishing are important.

THE MEDITERRANEAN OR BARBARY STATES

The Atlas region of North Africa lies within the political divisions known as Morocco, Algeria, and Tunisia. In the east, in Tunisia and Algeria, the Atlas system comprises two main mountain belts, the Tell Atlas and the Sahara Atlas, separated by a plateau, the Plateau of the Shotts. In Morocco the Tell Atlas curves away northwards as the Rif Mountains, the Great Atlas trends west-south-west, whilst the Saharan Atlas is prolonged as the Anti Atlas. These divisions are shown in Fig. 228.

It will be seen that in general three broad divisions may be distinguished.

- (a) The coastal strips or coastal plain.
- (b) The main mountain chains and the intervening plateaus.
- (c) The Sahara region in the south.

The rain-bearing winds of the winter come from the west, and so Morocco, on the west, enjoys the best rainfall.

Morocco.—The old Mahomedan Empire of Morocco is in principle an absolute monarchy under a sultan, but is now divided into three political zones.

- (a) The international zone, around the port of Tangier on the Strait of Gibraltar.
- (b) The Spanish zone, lying between Tangier and the French zone, about 60 miles wide.

(c) The French zone, comprising the remainder and the main part of the country.

Tangier, with a mixed population of Moors, Jews, and Europeans, is the natural port of Morocco, and is only $1\frac{1}{2}$ hours by steamer from Gibraltar. But it is cut off from the rapidly developing French zone by Spanish territory and is tending to become isolated.

The Spanish Zone includes the Spanish possessions and ports of Ceuta, Tetuan (on a river liable to be choked with sand), and Melilla, as well as the Spanish zone proper. This includes the wild, mountainous country inhabited by the turbulent Riffs. Motor roads connect Tangier with Tetuan and Ceuta, and Tangier with the French zone, but as a whole the Spanish zone is largely undeveloped.

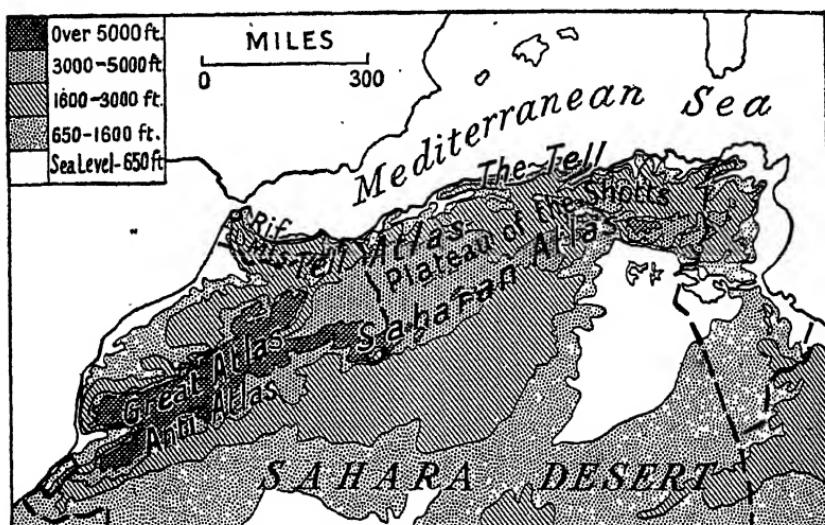


FIG. 228.—Physical map of the Barbary States.

The French Zone is a large and important tract. The French have shown amazing energy in the construction of towns and ports (such as the new French towns adjoining the old cities of Rabat, Casablanca, Marrakesh, Fez, and Meknes), of motor roads, and to less extent of railways. It is important to notice that France has developed especially the road and rail communications with Algeria on the east and the independent entries into the country especially *via* the great port of Casablanca. The country may be considered under the following regions :

The Coastal Plains are fertile; barley, wheat, and maize are widely grown. Huge numbers of Mediterranean fruit trees also exist—olives, vines, figs, oranges, etc. Numerous cattle are reared. Nearly one-half of the people of Morocco live in this fertile plain. Casablanca is the chief town and port. Rabat, a less favoured port

but the usual residence of the sultan; Safi, and Mogador are open roadsteads further south. Meknes and Fez are important inland trading centres. Behind the coastal plain, but before one reaches the Atlas Mountains, is a low plateau called the Meseta. Except near the hills, where there is water for irrigation, it is largely too dry for crops. But there are large numbers of sheep and cattle. On the Meseta is Marrakesh (or Morocco), an important market.

The Atlas Mountains and Enclosed Plateaus.—The mountains are often covered with forests of cork-oak, cedar, etc. The plateaus are capable of but limited development.

The Sahara has a number of oases with date palms.

Morocco is developing rapidly under French influence, and is

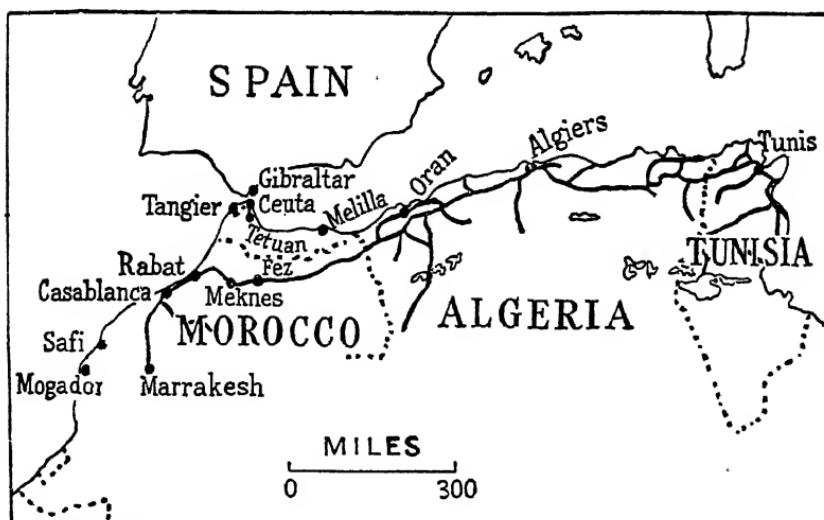


FIG. 229.—The Atlas region—railways.

believed to be rich in minerals. The exports include eggs, wheat, and barley, and were valued at 851,400,000 francs in 1927.

Algeria is a French colony, and has developed rapidly under French influence.

The Coastal Strip, lying between the crest of the mountains and the sea, is known as the Tell, and is the most important part of the country. The valleys and plains have good soil, but usually require to be irrigated. Large quantities of wheat and barley are grown, as well as the vine and various fruits. The progressive farms are mainly owned by Europeans. The hills are covered with forest or scrub forest, the most important trees being cork-oak, pine, and cedar. The higher parts of the hills are suitable for sheep-rearing, and, after wine, sheep form the chief export of Algeria. Along the coast sardine fisheries are important. The principal towns and ports are Algiers and Oran.

The Plateau between the Tell and the Saharan Atlas is known as the Plateau of the Shotts, a shott being a shallow lake which dries up in the hot season. The plateau is covered with poor grass on which feed many sheep and goats. The inhabitants are nomads, and move about with their flocks in search of good grass. The alfa grass is used for paper-making.

The Sahara has several oases, and the French have sunk artesian wells and made it possible to extend the fertile area. The great product is the date. Iron ore and phosphate are mined in Algeria, and other minerals in smaller quantity. The French have built a number of railways in Algeria and developed the country, so that its export trade (wine, sheep, wheat, tobacco) is seven or eight times as much as that of Morocco. The trade is mainly with France.

Tunisia is also a French Protectorate. It forms a continuation eastwards of Algeria, and may be divided into the same regions, but the Plateau of the Shotts is much narrower. The principal town is Tunis, near which are the ruins of Carthage.

EXAMINATION QUESTIONS

1. Give a reasoned account of the industries of Switzerland. (*Univ. London Inter. B. Com.*, 1925.)
2. Describe the course of the Danube and its chief tributaries in relation to the relief of Central Europe. (*Univ. London Inter. B. Com.*, 1925.)
3. Select any three of the following ports and discuss their position and the nature of their trade: Barcelona, Naples, Genoa, Marseilles. (*Univ. London Inter. B. Com.*, 1925).
4. Divide France into natural regions, giving a short description of each region. (*Univ. London Inter. B. Com.*, 1925.)
5. Describe and account for the distribution of population in Norway. (*Univ. London Inter. B. Com.*, 1925.)
6. Give a geographical account of the Elbe basin. (*Univ. London Inter. B. Com.*, 1926.)
7. Give a reasoned account of the main resources of Switzerland, and of the occupations of the inhabitants. (*Univ. London Inter. B. Com.*, 1926.)
8. Name four important trans-Alpine railway routes, and give some account of any two of them, indicating the areas served and the characters of the traffic carried by each. (*Univ. London Inter. B. Com.*, 1926.)
9. Compare the relief of the Iberian and Balkan peninsulas, showing in each case the relation between the relief and the main lines of communication. (*Univ. London Inter. B. Com.*, 1926.)
10. Give a geographical description of the Basin of the Severn. (*Univ. London Inter. B. Com.*, 1927.)
11. Discuss the distribution and the importance of the coalfields of Germany. (*Univ. London Inter. B. Com.*, 1927.)
12. Give a concise account of the general geography of Holland. (*Univ. London Inter. B. Com.*, 1927.)
13. Give geographical reasons for the limitations of the foreign trade of either Switzerland or Czechoslovakia. (*Univ. London Inter. B. Com.*, 1927.)
14. Describe the course of the Rhine and discuss the significance of its valley as a traffic route. (*Univ. London Inter. B.Sc. (Econ.)*, 1927.)
15. Consider the trade outlets of either Poland or the Serb-Croat-Slovene Kingdom. (*Univ. London Inter. B.Sc. (Econ.)*, 1926.)
16. Compare the natural resources of the United States of North America and the British Isles. Show how the extent of these resources has influenced the foreign policy of these two nations. (*Univ. British Columbia Sessional*, 1927.)
17. Indicate the importance of coal in the external commerce of Great Britain. (*Univ. Bristol Inter.*, 1925.)
18. Account for the present economic position of any two of the following:—Sheffield, the Tyneside, Nottingham, Preston. (*Univ. Oxford Cert.*, 1925.)
19. "In eastern England geographical factors have largely determined that agriculture should be the dominant activity during many centuries." Discuss this statement. (*Univ. Oxford Cert.*, 1925.)
20. Divide Scotland into its major climatic regions, describing the climate of each. (*Univ. Oxford Cert.*, 1926.)

21. Discuss the geographical advantages possessed by the iron-smelting industry around the Tees estuary. (*Univ. Oxford Cert.*, 1925.)
22. Analyse carefully with the aid of sketch-maps the position and historical development of *three* of the following towns: Copenhagen, Berlin, Madrid, Constantinople. (*Univ. Sheffield Inter.*, 1925.)
23. Compare the value for export of coal as regards position and access to the sea of the coalfields of Great Britain. (*Univ. Sheffield Inter.*, 1927.)
24. Give a brief account of the coal and iron resources of France and of Germany, and examine the relative opportunities of these two countries for the development of metallurgical industries on a large scale. (*Univ. Bristol Inter.*, 1927.)
25. Analyse carefully the position and indicate the importance of *four* of the following: Salonika, Dijon, Rosario, Lisbon, Madrid, Burgas, Moresnet, Memel, Fiume. (*Univ. Bristol Inter.*, 1925.)
26. Discuss the economic potentialities of Yugoslavia. (*Univ. Bristol Inter.*, 1926.)
27. Trace the interdependence of physical factors and agricultural production in Holland. (*Univ. Sheffield B.Sc.*, 1925.)
28. Give an account of either the Rhine or the Danube as (a) an avenue of commerce, (b) a potential or actual political boundary. (*Univ. Sheffield B.Sc.*, 1925.)
29. Compare and explain the agricultural production of France and Germany. (*Univ. Sheffield B.Sc.*, 1925.)
30. Compare and contrast the relief, climate, and agricultural products of the Po Valley and Wallachian Roumania. (*Univ. Sheffield B.Sc.*, 1925.)
31. Describe the geography of Poland, with special reference to (a) its economic life, (b) its political stability. (*Univ. Bristol Inter.*, 1924.)
32. Contrast the part played by climate in the economic life of (a) Great Britain, (b) Sweden, (c) Italy. (*Univ. Bristol Inter.*, 1924.)
33. Divide France into its major structural regions. Trace as fully as you can the influence of the geological structure and physical history of *one* of these regions upon its relief and drainage. (*Univ. Oxford Cert.*, 1927.)
34. Give some account of the influence of climate on human occupations in different parts of Great Britain. (*Univ. Oxford Cert.*, 1927.)
35. Examine the conditions and prospects of beet cultivation in the British Isles. (*Univ. Oxford Dipl.*, 1925.)
36. "France is the natural intermediary between the Mediterranean Lands and Northern Europe." Discuss the geographical basis of this assertion. (*Univ. London Inter. Arts*, 1927.)
37. Describe and explain the climatic transitions which occur in Europe from west to east near the latitude of London. (*Univ. London Inter. Arts*, 1927.)
38. Describe and account for the general distribution of population in either the Scandinavian or the Iberian Peninsula. (*Univ. London Inter. Arts*, 1927.)
39. Write a brief geographical account of either the London basin or Scotland north of the Highland line. (*Univ. London Inter. Arts*, 1927.)
40. Describe in relation to both physical and human geography the western border of Russia. (*Univ. London Inter. Arts*, 1927.)
41. What are the chief geographical advantages and disadvantages of Czechoslovakia for the development of large scale manufacturing industries? (*Univ. London Inter. Arts*, 1927.)
42. Compare Denmark and Ireland in respect of their economic geography. (*Univ. London Inter. Arts*, 1927.)
43. Give a careful account of *one* of the following pairs of ports, discussing the influence of position in each case: (a) Hull and Manchester, (b) Genoa and Venice, (c) Antwerp and Rotterdam. (*Univ. London Inter. Arts*, 1927.)

44. Write brief notes on the geography of *four* of the following : Albania, the Brenner Pass, Fiume, the Polish Corridor, the Saar Basin. (*Univ. London Inter. Arts*, 1927.)
45. Give an account of the climatic conditions of *either* Scandinavia or the Hungarian Plain, indicating the causes and consequences of these conditions. (*Univ. London Inter. Arts*, 1928.)
46. Describe the relief and structure of the Balkan Peninsula, and trace concisely the effect of these on lines of communication. (*Univ. London Inter. Arts*, 1928.)
47. Analyse the geographic conditions affecting the economic development of either (a) Holland, or (b) Ulster. (*Univ. London Inter. Arts*, 1928.)
48. Discuss the geographical factors in the development of *two* of the following : (a) Cologne, (b) Bordeaux, (c) Glasgow, (d) Danzig. (*Univ. London Inter. Arts*, 1928.)
49. Give an account of the cotton manufacturing industry in France, comparing the advantages (geographic and economic) of the different districts engaged in it. (*Univ. London Inter. Arts*, 1928.)
50. Give an account of the geographical factors favourable to the dense population and the industrial developments on the Plain of Lombardy. (*Univ. London Inter. Arts*, 1928.)
51. Write a brief essay on the English Channel. (*Univ. London Inter. Arts*, 1928.)
52. Describe the location and characteristic features of the English coalfields north of Yorkshire and Lancashire. How does their location influence the utilization of their coal ? (*Univ. London Inter. Arts*, 1928.)
53. Give a summary account of the distribution of the woollen industry in Great Britain ; and discuss more fully the geographical advantages of its principal centre. (*Univ. London Inter. Arts*, 1928.)
54. "In western Europe all geographical factors combine to ensure variety of product and facility of commercial intercourse." Discuss this statement. (*Univ. London Inter. B.Sc. (Econ.)*, 1929.)
55. "Germany has no natural focussing point." Describe the major geographical divisions of Germany so as to bring out the truth or otherwise of this statement. (*Univ. London Inter. B.Sc. (Econ.)*, 1929.)
56. Write a short essay on geographical factors in the localization of industry, with examples from the British Isles. (*Univ. London Inter. B.Sc. (Econ.)*, 1929.)
57. Consider the distribution of producing coalfields in Germany and its relation to natural facilities for distribution and to important industrial regions. (*Univ. London Inter. B.Sc. (Econ.)*, 1928.)
58. Describe briefly the chief natural regions that go to make up present-day France, paying special attention to those which tend respectively (a) to isolation, (b) to unification. (*Univ. London Inter. B.Sc. (Econ.)*, 1928.)
59. Enumerate the chief geographical characteristics of the Mediterranean Sea and its coastlands, and sketch briefly its present-day significance to Great Britain. (*Univ. London Inter. B.Sc. (Econ.)*, 1928.)
60. Indicate the chief geographical factors in the evolution of the North-Eastern iron and steel industry (i.e. Durham and N. Yorkshire). (*Univ. London Inter. B.Sc. (Econ.)*, 1928.)
61. Analyse the geographical position of *either* (a) Glasgow, or (b) Hull. (*Univ. London Inter. B.Sc. (Econ.)*, 1928.)
62. Describe comparatively the features of relief along the chief lines of communication between Belgrade and seas to the west, south, and east. (*Central Welsh Board, Higher Cert.*, 1927.)
63. Either, Write notes on the trade relations of the *four* most populous cities of modern times on or quite near the coasts of the Mediterranean Sea, Rome and Constantinople being excluded.
Or, Discuss comparatively Rome and Constantinople as international centres. (*Central Welsh Board, Higher Cert.*- 1927.)

64. Compare the prevalent winds of the eastern and western basins of the Mediterranean at the various seasons of the year. (*Central Welsh Board, Higher Cert., 1928.*)
65. Work out comparisons and contrasts either between Milan and Turin and between Genoa and Barcelona or between the various university cities of the Po basin. (*Central Welsh Board, Higher Cert., 1928.*)
66. Work out the resemblances and contrasts between the regions of southern France immediately east and west of the Rhone delta. Omit details of the delta itself and of Marseilles. (*Central Welsh Board, Higher Cert., 1929.*)
67. Write a short account of the physical geography of one of the following : The peninsula of Devon and Cornwall ; the Weald ; the Pennine Chain. (*Univ. Oxf. and Camb., Higher Cert., 1928.*)
68. Write a careful account of either the Clyde industrial region or the West Riding of Yorkshire. (*Univ. Oxf. and Camb., Higher Cert., 1928.*)
69. Either, Divide France into natural regions and write a brief account of the physical geography of each region.
Or, Write a brief account of the physical geography of the basin of either the Rhine, or the Danube. (*Univ. Oxf. and Camb., Higher Cert., 1928.*)
70. Select any three of the following towns, and illustrate and account for its importance in the history of Europe : Cologne, Constantinople, Marseilles, Venice, Vienna. (*Univ. Oxf. and Camb., Higher Cert., 1928.*)
71. Write an account of either the south Lancashire industrial region, or the agricultural areas of East Anglia. (*Univ. Oxf. and Camb., Higher Cert., 1929.*)
72. If you were called upon to select a capital city for a United States of Europe (excluding Russia), which city would you select ? Explain fully the reasons for your choice. (*Joint Matric. Board, Higher School Cert., 1929.*)
73. "Certain relief and structural features which occur in the coastal areas of the British Isles are repeated on the opposite sides of the North Sea and English Channel." Illustrate this statement by a discussion of three different examples. (*Joint Matric. Board, Higher School Cert., 1929.*)
74. Give a geographical account of the textile industries of France and Germany or vine cultivation in the Mediterranean lands or the textile industries of the United States. (*Univ. London Higher Schools, E., 1932.*)
75. Suggest the leading geographical contrasts between Scotland and Ireland. (*Univ. London Higher Schools, E., 1932.*)
76. Give a reasoned account of either the cultivation of cereals in Great Britain or the growth of manufacturing industries in South-Eastern England. (*Univ. London Higher Schools, E., 1932.*)
77. Explain why Leeds has become of greater importance than York, Southampton than Winchester, and Crewe than Chester. *Univ. London Higher Schools, E., 1932.)*
78. Compare and contrast either France and Italy or Switzerland and Czechoslovakia as regards resources, population and economic development. (*Univ. London Inter. B.Sc. (Econ.), 1932.*)
79. Examine the geographical factors which have led to the concentration of the population of Scotland in the Midland Valley. (*Univ. London Inter. B.Sc. (Econ.), 1932.*)
80. Give an account of the location and development of the dairying industry of the British Isles. (*Univ. London Inter. B.Sc. (Econ.), 1932.*)
81. Establish as many points of geographical resemblance as possible between the Midlands of England and the Midland Valley of Scotland. (*Univ. London Higher Schools Subsid., 1932.*)
82. Describe with reference to relief, climatic conditions and mineral resources the distribution of the major agricultural and manufacturing industries in either the three counties east of the Pennines or the three counties west of the Pennines. (*Univ. London Higher Schools Subsid., 1932.*)

83. Describe the hinterlands of three great ports on or near the eastern side of the North Sea, so as to show how each of them has developed to its present-day importance. (*Univ. London Higher Schools Subsid.*, 1932.)
84. With the aid of a sketch-map indicate the leading geographical features of either the Danube or the Volga basin. (*Univ. London Higher Schools Subsid.*, 1932.)
85. Draw a sketch-map of the Mediterranean Sea to show the principal approaches by land and sea from countries beyond its borders. (*Univ. London Higher Schools B. & D.*, 1932.)
86. Describe the climatic conditions of Spain and Portugal with special reference to the limits of the Mediterranean climate. (*Univ. London Higher Schools B. & D.*, 1932.)
87. Show by a reasoned analysis how geographical conditions have affected the development of communications in Peninsular Italy. (*Univ. London Higher Schools B. & D.*, 1932.)
88. Give a careful account of the geographical factors influencing the development of water power in North-Western Europe. (*Univ. London Higher Schools B. & D.*, 1932.)
89. Compare and contrast, with special reference to their influence on the life and activities of man, the fiord coasts of Norway and Scotland. (*Univ. London Higher Schools B. & D.*, 1932.)
90. Write a comparative account of dairy farming in the Irish Free State, Denmark and Holland. (*Univ. London Higher Schools B. & D.*, 1932.)
91. Analyse the position and importance of Liverpool, Hamburg, Southampton and Rouen. (*Univ. London Higher Schools B. & D.*, 1932.)
92. Give an account of the industrial development associated with either the Ruhr Coalfield or the Lanarkshire Coalfield. (*Univ. London Higher Schools B. & D.*, 1932.)
93. Give a concise account of the geography of either Morocco or Algeria. (*Univ. London Higher Schools B. & D.*, 1932.)
94. Show how climatic factors largely determine the arrangement of the zones of natural vegetation from Equatorial Africa to Northern Russia. (*Univ. London Higher Schools B. & D.*, 1932.)
95. Consider how far the occupations and the distribution of population in the Scandinavian peninsula are related to its physical (including climatic) features. (*Univ. London Inter B.A. and B.Sc.*, 1932.)
96. Compare and contrast the situation and activities of Havre, Marseilles, and Southampton. (*Univ. London Inter B.A. and B.Sc.*, 1932.)
97. Write a comparative account of the physical and climatic conditions of Wales and East Anglia. (*Univ. London Inter B.A. and B.Sc.*, 1932.)
98. Describe carefully and explain the distribution of population in Northumbria. (*Univ. London Inter. B.A. and B.Sc.*, 1932.)
99. Divide Germany into natural regions and justify your division. (*Univ. London Inter. B.A. and B.Sc.*, 1932.)
100. Describe, and suggest reasons for, the distribution of wine-grape cultivation in the Mediterranean area. (*Univ. London Higher Schools B. & D.*, 1933.)
101. Show how geographical conditions have affected the development of communications in the Balkan Peninsula. (*Univ. London Higher Schools B. & D.*, 1933.)
102. Give a reasoned geographical account of the agricultural industries of either Egypt or the North Italian Plain. (*Univ. London Higher Schools B. & D.*, 1933.)
103. Divide North Africa (Morocco, Algeria and Tunisia) into geographical regions. (*Univ. London Higher Schools B. & D.*, 1933.)
104. Indicate, and suggest geographical reasons for, the distribution of population in two of the following: the Spanish Meseta, Greece, Palestine. (*Univ. London Higher Schools B. & D.*, 1933.)

105. Describe the results of glaciation to be observed within the area of North-Western Europe. (*Univ. London Higher Schools B. & D.*, 1933.)
106. Examine the importance of the North Sea and of the Baltic Sea in the commerce of North-Western Europe. (*Univ. London Higher Schools B. & D.*, 1933.)
107. Describe and explain by reference to geographical conditions the distribution of wheat, barley, oats and rye cultivation in North-Western Europe. (*Univ. London Higher Schools B. & D.*, 1933.)
108. Compare and contrast with special reference to their influence upon human activities the geographical settings in Switzerland and Denmark. (*Univ. London Higher Schools B. & D.*, 1933.)
109. Give an account of the industrial development of Belgium or Yorkshire or the Northern Coalfield of France. (*Univ. London Higher Schools B. & D.*, 1933.)

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